

Contractors *and* Engineers Monthly

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Highlights Of This Issue

• Roads in Wartime

The place of highways in an all-out war effort and the effect of war on roads and road construction are subjects of vital concern these days. In this issue we present an article from England on the highway situation in that country as affected by the war, and also a discussion by leading state highway officials in this country on the highway situation here.

See pages 1 and 7.

• Defense Construction

One of the most vital phases of defense construction is that concerned with airplane production and use. The paving operations for the concrete taxiways at a new midwest aircraft manufacturing and assembly plant, and the construction of soil-cement aprons at a new eastern army airfield are described in this issue.

See pages 1 and 10.

• Improving Old Roads

Because of the emphasis on highway maintenance due to the war effort and the importance of keeping present highways in the best possible condition, the article describing Mississippi's program of improving old roads with a heavy hot-mix seal or retread, using state-owned portable asphalt plants, is particularly timely.

See page 1.

• New Boulevard Highway

Three phases of the construction of a new concrete boulevard serving as the northern entry to Duluth, Minn., including the grading operations, the aggregate plant, and the concrete paving, are described in this issue.

See page 2.

• Well-Budgeted County Work

Careful planning of finances as well as of all highway operations features the work of the Highway Department of Minnehaha County, S. D., with the result that the County has no bonded indebtedness and the Department had money in the bank at the end of the year.

See page 2.

• Proper Care of Tires

Some helpful and timely hints which will make it possible to secure longer life from your present tires, thus contributing to the war effort as well as insuring prolonged use of your present automotive equipment, are contained in this issue.

See page 21.

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C. & E. M. Photo
The Cleaver tank-car heater that worked day and night on a Mississippi retread job.

Heavy Hot-Mix Seal Improves Old Roads

Portable State-Owned Asphalt Plant Operated By Maintenance Division In Mississippi

† THE asphalt plants used by the Maintenance Division of the Mississippi State Highway Department are called upon to work 12 months a year and to be flexible enough for the varied set-ups required, as they are moved every one or two months. They furnish the hot-mix retread or seal for topping the older concrete and bituminous roads which have shown failures, to strengthen the surface, take out high crowns, and pro-

(Continued on page 32)

Concrete Taxiways At New Bomber Plant

Lighter Construction Than Service Roads At Aircraft Plant in Middle West Built By Kiewit-Condon-Woods

† THE contract for paving at a new Aircraft Manufacturing and Assembly Plant in the middle west called for the construction of 174,000 square yards of concrete pavement in access roads, taxiways and hangar aprons, in addition to 148,000 square yards of asphalt paving in parking areas and 250,000 square yards of asphalt pavement in runways (C. & E. M., Feb., 1942, page 2). For service roads a 9-7-9-inch section was used because of the heavy hauling of supplies to be delivered by truck, and an 8-6-8-inch section for the taxiways and aprons where the loads will be slow moving and without impact.

Taxiway No. 1 Design

Taxiway No. 1 is 100 feet wide and was paved in five 20-foot lanes with the 8-6-8-inch cross section. Contraction

The Impact of War On British Roads; By-Passes a Benefit

By LT. COL. SIR CHARLES BRESSEY,
Former Chief Engineer, Roads Department,
Ministry of Transport

Special to Contractors and Engineers Monthly

† ONE of Britain's most valuable assets is the network of highways created in the course of 2,000 years. The length of public roads in the United Kingdom is approximately 180,000 miles. Trunk roads and Class 1 roads account for about 15 per cent of this total; Class 2 roads for about 10 per cent; and unclassified roads for about 75 per cent, comprising the bulk of residential streets and country lanes. Vast sums have been spent on the formation, improvement and upkeep of this road system, the length of which in so small a country testifies to the denseness of population.

Cheap transport being one of the prime requisites of commerce and industry we should all contemplate with anxiety the risk of any permanent loss of efficiency due to neglect of the road system, even in times of the gravest national emergency.

Rationing, however, is one of the commonplace, though sometimes irksome, features of national life in wartime. The privations are not by any means invariably hurtful, and they may serve to stimulate our ingenuity. Owing

Ministry of War Transport Has Reduced the Funds for Road Work; Vast Network Easily Detours War Damage

to the immense calls on the national purse it is evident that, when totalitarian war rages, every public service must submit to the rationing of its expenditure by the Government which alone is in a position to set up a graduated table of priority.

No road engineer, however zealous, can expect that his plans and estimates will escape scrutiny but he will do his best to convince the Government of the value of the contribution made to the national effort by a well maintained highway system. He will point to the grievous casualties on Britain's roads (1,024 deaths in the month of December, 1941) as justifying a generous outlay on better highways, though unfortunately a rising curve in road expenditure is not always associated, as one would wish it to be, with a falling curve in accident statistics.

Road experts will also plead from experience gained in 1919 that the neglect or postponement of road maintenance is in the long run an expensive form of economy and that efficient road transport may prove a decisive weapon in the drive towards victory. Similar claims will, however, be advanced by other forms of transport,—railways, inland waterways, shipping, airways, etc. With all these competitors in the field, the allocation of funds to highways is not likely to be a bountiful one, either on the part of the State or the Local Authorities,—these latter being already burdened with a heavy load of unfamiliar, wartime responsibilities.

Test for New Road Schemes

It is characteristic of Britain's present
(Continued on page 44)



U. S. E. D. Photo
Pouring concrete for the taxiway at the entrance to a new aircraft assembly plant in the middle west.

New Boulevard Route North Entry to Duluth

All Aggregate for 2-Year Paving Contract Produced At One Pit One Mile North Of Job; Efficient Layout

✦ SPRING water for the final wash was the secret of the truly clean aggregate produced by Central States Construction Co., of Crosby, Minn., just one mile beyond the north end of its 9.8-mile concrete paving project on U. S. 53 between Duluth and the small town of Twig to the north, en route to the iron mining region. Both gravel and sand were produced in sufficient quantity to permit the required stockpiling at the plant for 24 hours before moving the material to the working stockpiles at the batching plant. This insured a more uniform moisture content for the batches.

Pit Excavation

A Koehring 303 $\frac{3}{4}$ -yard shovel worked against a 12-foot bank of gravel, loading out to two shuttle trucks which hauled the material to the plant. The trucks drove over a grizzly composed of small rails set with a 6-inch opening. One man at the grizzly removed the oversized stone to one side and hand-sledged it, so that there was a minimum of waste from the pit.

Scalper and Twin Crushers

A Diamond Iron Works 20-inch reciprocating feeder delivered the material from the grizzly hopper to the main belt of the crushing, screening and washing plant. This 24-inch belt, 100 feet long, delivered the material to the 4 x 6-foot Diamond single-deck vibrating scalper screen with $2\frac{1}{2}$ -inch screen mesh. Material passing this screen continued to the second belt, while the material retained was split and delivered to two jaw crushers, an Austin-Western 10 x 20 and a Universal 836, which reduced the material to smaller than $2\frac{1}{2}$ -inch size and returned it to the main belt. The two crushers were driven by a single 120-hp Waukesha motor. The screened material was taken from the first vibrating screen to the washing plant on a 24-inch wide belt.

The Washing Plant

The washing plant, consisting of a Diamond scrubber, was set at right angles to the line of the second belt. The scrubber was 8 feet long x 40 inches in diameter with a 10-foot sand jacket 60 inches in diameter. A $\frac{3}{8}$ -inch screen inside the sand jacket made possible the proper separation of aggregate and sand. Heavy sprays of water within the sand jacket provided secondary washing of the aggregate. Water was provided from a nearby creek by a Fairbanks-Morse 8-inch centrifugal pump driven by a 70-hp Waukesha motor. Another motor of the same size and make drove the washer and vibrating screen.

(Concluded on page 20)



C. & E. M. Photo
Panorama of the complete crushing, screening and washing plant owned by the Central States Construction Co.



C. & E. M. Photo
The main delivery belt to a pair of jaw crushers, driven by the 12-hp Waukesha engine shown in the foreground, used by the Central States Construction Co.

Whitmas & Borg of Duluth Handle Grading on 9.8-Mile Paving Contract; Scrapers Kept Moving on Soft Spots

✦ THE opening up of the new boulevard highway which approaches Duluth, Minn., from the north and west has now become a reality, with the completion of 266,000 cubic yards of grading in two years by Whitmas & Borg, Duluth contractor, and the laying of the last yard of 131,461 cubic yards of concrete paving by Central States Construction Co., of Crosby, Minn. Careful

(Concluded on page 13)

Central States Const. Co. Paves One-Half of Highway In 1940, Completes Work on Minn.-U.S. 53 in 1941

(Photos on page 52)

✦ THE contract for the paving of 9.8 miles of U. S. 53 as an approach to Duluth, Minn., from the northern Iron Range cities of Virginia, Hibbing and Chisholm was awarded in 1940 to the Central States Construction Co. of Crosby, Minn., with sufficient calendar days that a large portion of the grading, done by Whitmas & Borg of Duluth, and one-half of the concrete paving could be completed that year on new location to give an improved 22-foot roadway, while traffic used the existing 24-foot black-top road. Then the grading on new location at the northern end and the second roadway along the line of the old road, and with 30 feet of boulevard between the two concrete roadways, was completed during the 1941 construction season. The boulevard strip is graded to drain to the center with drop inlets at each culvert.

Gravel Base

Inasmuch as this highway was built in a frost-boil area, pit-run gravel was placed over the subgrade to insulate against the deep penetration of frost which would cause the boils in the clay subgrade. On this, depending on the character of the base, from 4 to 8 inches of crushed gravel with a maximum size of $\frac{3}{4}$ inch was spread uniformly to the

(Continued on page 12)

County Highway Dept. Has Budgeted Program

Minnehaha County, S. D., Has No Bonded Indebtedness and Highway Department Has the Surplus Cash for New Work

✦ MINNEHAHA County, South Dakota, is far from being the wealthiest county in the United States; but it has the creditable distinction of having no bonded indebtedness, due not to a pinch-penny attitude but to careful planning of the financial operations of all county departments. The County Highway Department is no exception to this careful budgeting, for at the close of 1941 it had \$50,000 unexpended balance in its funds to apply to its 1942 program.

County Organization

A Board of five Commissioners comprises the governing body of the County, a commissioner being elected at the general election every two years for a 4-year term. This Board appoints a Highway Superintendent each year. Formerly the state law required that the

appointment be for two years, but that was changed during the drought years when some of the counties were so poor that they were unable to have any county engineer, even though such an appointment was required by state law. Now the law merely permits the appointment of a County Highway Superintendent.

The present County Highway Superintendent of Minnehaha County, F. H. Schrader, is now in his third year of office, and has applied the same careful planning and judgment to this work that he gave to his former position as State Highway Engineer of South Dakota. The County Highway Department has forty full-time employees, including the Superintendent, an Assistant Superintendent for field work, and a head clerk and stenographer in the office.

Financing

Minnehaha County has no road levy against real estate and private property, as do most other South Dakota counties; but it does make a bridge levy definitely for that purpose and amounting to \$25,000 for 1941. Additional funds are received from the 4-cent state gas tax, as $\frac{1}{2}$ cent is set aside by the State for county highway departments, the division being based on the assessed valuation of the county and the monies being distributed monthly. Minnehaha County's share in 1941 was \$45,000.

The vehicle-license fees in South Dakota are collected by the counties, which retain $46\frac{1}{2}$ per cent of the collections in their own counties, pay 20 per cent to the State Highway Department, $3\frac{1}{2}$



C. & E. M. Photo
A J. I. Case tractor and mower with its telltale flag working near Maquoketa in Iowa.

Mowing the Roadside From Spring to Fall

Davenport Division, Iowa Highway Commission, Keeps Steady Parade Of Motor and Horse-Drawn Mowers At Work on Shoulders and Ditches

✦ AS one traveled the highways of Iowa during the past summer, every few miles one met a mower with its sickle bar cutting a clean swath along the shoulder, ditch or backslope. Often it was pulled by a pair of horses toiling along the shoulder or just as frequently the mower was powered by a small agricultural tractor which travels much faster and does not get tired.

We stopped and chatted with A. L. Tubbs, operator of Equipment A-2411, a J. I. Case tractor and mower on U. S. 61 just north of Maquoketa, Iowa, and found him interested in telling how the Davenport Division keeps the weeds and grass down for safety all summer and to prevent their acting as a snow trap in winter.

"We start out in the spring with our two Case power mowers and make three rounds on the shoulders on 140 miles of road before Memorial Day," reported Mr. Tubbs. He then said that the horse and power mowers started out and cut grass and weeds from right-of-way fence on one side to the fence on the other, including the shoulders, backslopes and borrow pits. This operation is repeated every few weeks during the season. The final cut is made on the shoulders just before snow falls to be certain that all weeds and high grass are laid low that they may not trap snow on the road and increase the difficulty of snow plowing.

Maintenance operations in the Davenport Division are in charge of W. C. O'Connor, Division Maintenance Engineer and the section in which Mr. Tubbs works is in charge of H. A. Smith, Foreman, located at Maquoketa, Iowa.

per cent to the State Treasurer for the administration of the Motor Vehicle Department and for license plates, and retain 30 per cent for the townships within the county. The township money is distributed on the basis of the area of

(Concluded on page 40)



C. & E. M. Photo
F. H. Schrader, County Highway Superintendent, Minnehaha County, S.D.

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THEODORE REED KENDALL, Editor	O. E. POTTER, Managing Editor
EDGAR J. BITTENHEIM, President	DONALD V. BITTENHEIM, General Manager
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Proper Treatment of Intersections Of Primary and Secondary Highways

Driving south on a Federal route in the Northwest from its intersection with another Federal route, we noted that, in the reconstruction of the north and south highway with a bituminous-treated base, wide sweeping curves have been built by the State Highway Department to furnish the intersections for county roads with the main high-speed heavily traveled highway. The main highway is paved 24 feet wide and the county road has a 20-foot gravel top.

Interviewing local residents, it was found that the wide flaring paved entrances to the main highways have resulted in an increase in accidents in spite of the "Stop" signs at every intersection. This would seem to be a question of human psychology needing careful study. The intersections are flared on 40-degree curves, about 100-foot radii, and make it easy to run a farm truck and trailer out onto the road without any maneuvering or need of slowing down to make the turn. Therein lies the solution of the problem, we believe. If the intersection is easy to negotiate, the driver will be led to take a chance despite the "Stop" sign and the law. On the other hand, if there is any difficulty attached to making the turn there is obvious need of slowing down and even if the "Stop" sign is ignored, the vehicle

is traveling much more slowly and hence is under better control.

This better control may be forced on the driver by making sharper turns at the intersections which still have an element of hazard because the driver is very likely to go more than half-way across the road to make the turn comfortably. This brings up the solution suggested by Jac Gubbels of the Texas State Highway Department in his book, *American Highways and Roadsides*. Mr. Gubbels has suggested a slight jog in the intersecting road which makes it necessary for the driver to slow down the vehicle as he has an artificial S-turn in his path just before he gets to the main highway.

At one time we felt that Mr. Gubbels was offering an undue obstruction to traffic on tertiary roads wishing to enter primary or secondary highways, but our observations of many narrow escapes from accidents on the part of farm traffic in the past three years lead us to believe that his solution, while requiring a slight addition to the cost of preparing the intersection of county or township roads to main highways, is still the best solution yet offered to cure the careless driver. This is an instance where design can be used to defeat human carelessness.

Most Valuable Mile In Our Road System

What is the most valuable mile of highway in America today and what makes it valuable? These two questions are asked and answered in an interesting article in a recent issue of *Douglases*. The answer is—it is any or all of the miles of American highways which aid in national defense, for upon the highway falls the load, to a large extent, of linking armament plants together. Never before has the importance of a vital arterial highway system stood out in such stark reality.

The article points out that the manufacture of the implements of war is not unlike the process of the manufacture of peacetime articles. For example, automobiles are assembled at factories, which depend on a vast subcontracting set-up. These smaller firms are not always in the same cities as the assembly plants, and frequently not even in the same state. The assembly lines, while continuous in operation in one sense, are often composed of several assembly plants. These, too, may be and are in different cities, miles from the main assembly lines. To link these individual industries together, and to perform the function of badly needed high-speed production, American highways must be open and in good condition at all times.

Exclusive of the demands of produc-

tion for a good highway system at all times, the article goes on to point out the other factors which tend to strengthen the demand. Studies by Lt.-Col. Lacey V. Murrow, former Director of Highways for the State of Washington, on highway services in relation to war-time conditions are interesting. As Lt.-Col. Murrow has stated, "Adequate modern transportation has proved to be one of the greatest single factors in present offensive or defensive warfare. In all the campaigns in which the German Army has thus far been engaged, rapid transportation has been of greatest importance. Perhaps in no single instance is this fact more clearly demonstrated than in the Battle of France."

"Discussions with French, Belgian and English officers, who participated in and observed to the fullest extent this operation, disclose two most interesting facts. The German Army made full use of the entire network of roads, and it has been stated that there was little or no cross-country movement of tanks or other mechanized units. Every detail as to movement, supply, and the maintenance of these mechanized units was carefully worked out in advance. Allied aerial observation reports indicate that there was never at any time confusion or congestion on the various portions of the road system that was being used by the German Army."

Lt.-Col. Murrow's report would indicate that all roads are of strategic mili-

U.S. Gas Consumption Reached Peak in 1941

Gasoline consumption in the United States was 2½ billion gallons greater in 1941 than in 1940, according to an estimate recently released by the Public Roads Administration. The estimate is based on reports from tax collection agencies covering at least eight months of the year. Highway use amounted to 24.3 billion gallons out of a total use of 26.6 billion gallons.

For the entire United States, the increase amounted to 10.7 per cent. Alabama and South Carolina had the greatest increase, 19.4 per cent. Other states with an increase of more than 15 per cent were Florida, Kentucky, Louisiana, Mississippi, North Carolina, Tennessee and Virginia. The District of Columbia had a 15 per cent increase.

War activity, particularly troop and transport movements, and transport for war production over the highways undoubtedly accounted for a considerable part of the increase. The Public Roads Administration points out that these figures do not reflect results of efforts to reduce travel made since the beginning of the war. December gasoline consumption figures are not yet available.

Motor vehicle registrations are estimated to have increased 7.3 per cent during 1941. The estimate includes 29,375,000 passenger cars, 68,000 busses, and 4,911,000 trucks. The figure for busses covers only 41 states, as in 7 states busses are not reported separately. State and federal vehicles are not included in the estimate.

Comparative Expenses For Missouri Highways

A recent study of expenditures of the Missouri State Government for the biennium 1873-4 with those of the biennium 1939-40 has been released by the Governmental Research Institute of St. Louis, Mo. The total expenditures for the state increased from \$5,254,780 in 1873-4 to \$170,726,224 in 1939-40, an increase of 3,149 per cent. Attention is called to the fact that the principal reasons for this increase are in the expenditures for social welfare services, schools and highways. In the earlier biennium nearly one-third of all expenditures were for general government while these now represent only 5 per cent. Forty per cent of the expenditures in 1873-4 represented amounts needed to meet interest on indebtedness. This indebtedness had been created almost entirely for the purpose of aiding the construction of railroads during the period 1851-65. The third most significant item during the years 1873-4 was for schools.

In the last biennium the three most significant classes of expenditures have been those for charities, schools, and highways, these accounting for 75 per cent of all cost expenditures. Charities represented only 1 per cent of the total in 1873-4, but now represent 32 per cent. Expenditures for schools increased from 16 to 25 per cent. Expenditures for highways did not appear in the budget of 1873-4, but now represent 19 per cent of total cost expenditures.

The sources of revenue for the state government have undergone an almost complete change during these 66 years. During the biennium 1873-4, the general property tax provided 98 per cent of all state revenue receipts; today it provides only 6 per cent. Grants from the Federal Government constituted only 0.4 per cent of the total of 1873-4, but now constitute 19 per cent. Taxes that were entirely unknown to Missouri in 1875, including the gasoline tax, provided more than 70 per cent of all state revenue receipts in the last biennium, sales taxes alone contributing 44 per cent.

tary importance in modern warfare and that value in military movement should in no way be underrated.



"I'll wait till yer finished. That detour'll put too much wear and tear on my tires."

Steel Conservation Covered in Report

To conserve steel during the emergency, many practical suggestions have been made by engineers to the Office of Production Management in a report prepared by a committee of members of the American Society of Civil Engineers. Their report, released by O.P.M., suggests the substitution for steel of non-metallic materials, the use of higher working stresses, and the modification of building codes for temporary structures, methods of salvaging steel not ordinarily economically practicable, and the demolition of abandoned buildings, tracks and other steel structures.

Loads permitted on reinforcing steel for concrete by the New York City Building Code are advocated for general adoption. These agree with progressive modern practice and are more liberal than many other codes. Allowable working stresses for temporary structures should be increased within actual conditions of safety but involve reduction in the present margins of safety which are intended for permanent structures.

The report suggests that plain masonry should take the place of reinforced. Wood likewise would have greater use. As a net result of the various recommended changes, steel and other critical materials would be conserved for use in emergency military construction.

These recommendations are advocated by a committee of civil engineers of which Carlton S. Proctor is chairman and including also Rene L. Bertin, Richard E. Dougherty, Shortridge Hardesty, and J. P. H. Perry, all of New York City, and Charles F. Goodrich, Pittsburgh.

New Mexico Canal Nearly Half Done

The 75-mile Conchas Canal, the main feature of the Tucumcari Reclamation project which will irrigate 45,000 acres of rich agricultural land in northeastern New Mexico, was approaching the half-way mark at the end of 1941.

Summarizing the work done during last year, Commissioner John C. Page of the Bureau of Reclamation reported that excavation of 30.5 miles of the main canal had been completed, including 19,649 linear feet of reinforced-concrete siphons; 4 miles of tunnel had been bored, 3 miles of which had been lined with concrete; more than 183,000 tons of concrete aggregate had been processed and had been used or was stockpiled; and the irrigation outlet, stilling basin and rating section at the head of the canal had been constructed.

The Conchas Canal, main canal for the irrigation system, will take water from the 600,000-acre-foot reservoir formed by Conchas Dam, which was completed by the Corps of Engineers in 1939.

During 1942, if conditions permit, it is planned to construct a 20-mile section of canal between Conchas reservoir and the project lands to irrigate 6,000 acres of the most desirable land of the project in the vicinity of Tucumcari.

New Booklet on Highway Structures of Douglas Fir

A new 40-page booklet devoted to the use of Douglas fir in highway structures, such as guard rail and posts, wood stave culverts, and bridges of various types, has recently been issued by the West Coast Lumbermen's Association, 364 Stuart Bldg., Seattle, Wash.

In the face of shortages of steel and other materials, state and county highway engineers can secure from this book-

let a number of ideas and design suggestions involving the use of timber for making much-needed highway improvements. Among the types of bridges discussed and illustrated by photos and diagrams are the timber-concrete composite deck on a laminated wood base and composite timber-concrete decks on wood stringers. The details of a number of such structures now in use are given.

Copies of this new booklet "Highway Structures of Douglas Fir" may be

secured direct from the West Coast Lumbermen's Association by mentioning this item, or from this magazine.

New Bulletin Describes Cement Gun and Gunite

A new 76-page bulletin, No. 2200, describing and illustrating the Cement Gun, and discussing in considerable detail the many uses and applications of Gunite, the sand-cement product of the Cement Gun, has recently been issued by

the Cement Gun Co., Allentown, Pa., to supersede its Bulletin No. 1200.

The pages devoted to the many uses of Gunite include interesting job photos and diagrams of its employment for dams, reservoirs, irrigation canals and flumes, tunnels and sewers, repairs to concrete, and other services.

Copies of this new bulletin No. 2200 may be secured by interested contractors and engineers direct from the Cement Gun Co. by mentioning this item, or from this magazine.

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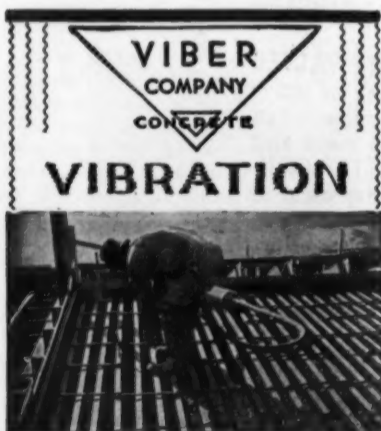
The new Bros rotary snow plow with loading chute.

A New Rotary Plow Speeds Snow Removal

The new Bros rotary snow plow, made by the Wm. Bros Boiler & Mfg. Co., Road Machinery Div., Minneapolis, Minn., was tried out late last winter in upper New York state where successive drifting, thawing and freezing had resulted in several layers of blue ice from 6 to 8 inches thick. It is reported that this new plow made its way through 18-foot drifts with speed and efficiency without the aid of blasting or shoveling.

This new Bros rotary consists of a sturdy powerful rotating rake which breaks up packed or broken snow and delivers it to the rotors which pulverize the snow and throw it, by means of reversible chutes, to either side of the road. It is stated that the large capacity of these rotors speeds up snow and ice-removal operations. The entire plow is ruggedly constructed and heavily reinforced to withstand abuse, and is especially designed to facilitate quick and easy field repairs. It may be removed from the truck in less than an hour, quickly releasing the truck for other work.

These rotary plows are available in two models, Model 37 PR for use with short-wheelbase four-wheel-drive trucks of 3 to 7-tons capacity, and Model 38 PR for trucks 7 tons or over. In Model 37 PR the rake is 8 feet wide, the rotors 3 feet in diameter, and the height of the plow, 3 feet 9 inches. Model 38 PR has a 9-foot rake, rotors 4 feet in diameter, and is 4 feet 8 inches high. Both models are equipped with full power hydraulic controls operated from the cab. Power for the plow is furnished by a 188-hp or a 134-hp Buda engine.



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When the job calls for mass vibration—the Viber Vibrator at work above is your best bet. Especially made for walls over 10 inches thick, foundations, large girders, thick floor slabs, columns . . . large reinforced concrete bridges, grade separations, concrete floor systems, concrete arches and rigid frame structures . . . In a word, for all concrete with large aggregate and low water-cement ratio.

Write for complete VIBER data TODAY!

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BURBANK, CALIFORNIA

The manufacturer states that the trucks must be equipped with low gear ratios, preferably 200 to 1.

Further details on this new Bros rotary snow plow and its performance records are contained in a new folder, copies of which may be secured by state, county and town highway engineers direct from the manufacturer by referring to this item.

First of Two Volumes On Highway Practice

Volume I of *American Highway Practice*, by Laurence Hsley Hewes, M., Am. Soc. C. E., and Chief, Western Region, Public Roads Administration, is the first of two volumes on modern and essential data on highway practice, prepared as a reference work for highway engineers, asphalt and concrete technologists, landscape engineers or architects, and advanced students of civil and highway engineering.

In Volume I are discussed such sub-

jects as highway location, the design of the roadway, grading the roadbed, highway landscaping and roadside planting, sand-clay and stabilized roads, macadam roads, gravel and fine-crushed rock roads, and intermediate bituminous surfacings, with a selected bibliography for each of these subjects, appendices and index.

This treatise offers an up-to-date thorough detailed presentation on highway location, design and construction. Only such subjects are omitted as are thoroughly treated elsewhere, such as the handling of construction jobs by the resident engineer and problems of traffic engineering. Enough historical background is given to show the development of each type of road surface and pavement, and the results of all important research and experimentation for the past 25 years are incorporated in the discussion. Volume I is devoted particularly to the intermediate bituminous types of surfacings and is fully illustrated with photographs, charts and line drawings, while Volume II will

deal with asphaltic, concrete and brick pavements.

Copies of *American Highway Practice*, Vol. I, which is published by John Wiley & Sons, Inc., 440 Fourth Ave., New York City, may be secured direct from the publisher or from this magazine. Price: \$5.00.

Spray Painting Equipment

A new 32-page catalog on paint spray equipment for manual and automatic operation and on Pneumix air-motored agitators for all paint-mixing jobs in batches up to 200 gallons has been issued by the Eclipse Air Brush Co., 400 Park Avenue, Newark, N. J. An introductory section of this catalog, No. 80, outlines the reasons for the low pressure principle under which all Eclipse spray equipment operates.

This free-on-request booklet is illustrated with many pictures of the equipment in operation on various types of work and may be secured direct from the manufacturer by mentioning this item.

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HUNDREDS OF THE COUNTRY'S largest fleet operators have stopped changing of wheel-bearing lubricant seasonally . . . they are now using *Texaco Marfak Heavy Duty*.

Texaco Marfak Heavy Duty lubricates effectively winter and summer . . . doesn't leak out at highest operating bearing temperatures. It keeps off brakes, assuring safer braking in all seasons.

The outstanding performance that has made Texaco preferred in the fields listed in the panel has made it preferred on prominent construction jobs throughout the country.

These Texaco users enjoy many benefits that can also be yours. A Texaco Automotive Engineer will gladly cooperate . . . just phone the nearest of more than 2300 Texaco distribution points in the 48 States, or write:

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RETURN METAL DRUMS PROMPTLY . . . thus helping to make present supply meet industry's needs and releasing metal for War Needs.

Highway Progress As Affected by War

State Highway Officials Present Views on Finance, Construction and the Need For Intensive Maintenance

THE financing of most state and county highway work is through collection of gas taxes by the states. Stoppage of automobile production and rationing of tires will greatly reduce motor travel, perhaps not in 1942, as hundreds of thousands of tires still have hundreds of millions of miles of travel in them, but by 1943 the number of usable tires will have been reduced greatly, with the assured result of a much lower gasoline consumption on which a tax will be collected.

A poll of state highway officials by CONTRACTORS and ENGINEERS MONTHLY on the effect of the war effort on highway financing, construction and maintenance brought together valuable discussions of these topics for our readers.

Increased Demands on Highways

The growing dependence upon our highways has been evidenced over a period of years by the greater and ever-increasing number of communities whose products are carried and whose food and other supplies are received entirely by highway transportation.

Charles D. Vail, State Highway Engineer of Colorado, reports, "During the past 20 years several thousand miles of railroad lines have been abandoned in our state, mostly in the mountain areas, and many communities are now entirely dependent on highways for their means of marketing what they produce and for the importation of goods that they need."

C. F. Seifried, Chief Highway Engineer, State of Wyoming, forecasts the need of more intensive maintenance to alleviate the extra burden on the railroads. "If automobile travel is going to be cut down a great many of the problems of highway construction and maintenance will be taken care of automatically. If the railroads, however, are unable to carry the load which is being put upon them, it may be necessary to carry on more intensive maintenance and reconstruction on parallel highways in order to take some of the load off the railroads."

The National Highway Users Conference, in a recent statement sent to Director Donald Nelson of the War Production Board, gives the following pertinent

examples of American dependence upon highway transportation: (1) Use of the passenger automobile by workers in defense industries in getting to and from their jobs; (2) 2,320 cities and towns with a combined population of 12½ million without any form of local public transportation; (3) 48,000 communities in the Nation completely dependent upon highway transportation; (4) 32,400 rural letter carriers; (5) Additional movement of freight by highway to and from defense plants, and (6) Increased movement of millions of tons of farm products by highway resulting from the increased wartime agriculture production program.

Construction Needed

"The first consideration perhaps

should be given to the importance of highways to national defense. Emphasis thus far has been placed on the highways comprising the strategic network, which of course is important. However," states M. L. O'Neale, Chief Engineer, State Road Commission of West Virginia, "I feel that in our zeal to improve these particular highways we are overlooking the importance of our other roads. The whole trend in this country for the past 20 years has been toward highway transportation—transportation not only of materials and supplies but of labor. As a result, other means of transportation have been neglected and can not be restored immediately. West Virginia is a large producer of raw materials—coal, oil and gas and timber for example. These raw materials are not located on main highways or main railroad lines. Their development and continued operation depend on highways which for the most part may be considered secondary, but without which the production of the state would be very seriously handicapped. To me

they constitute a very real asset in our defense program."

Reduction in Funds

Ezra B. Whitman, Chairman, Maryland State Roads Commission, analyzes the threat of reduced highway income very carefully. "In Maryland, and many of the other states, dependence for securing money for highways is placed almost entirely on the receipts from gasoline taxes, automobile licenses, and in a small way from fines and other minor sources. The vast majority of the money, however, comes from the automobilist.

"What effect will the rationing of tires have on the use of automobiles and, therefore, the purchase of gasoline? It also appears that gasoline itself may be rationed and what will be the effect of this rationing on the consumption of gasoline by the automobilist? Undoubtedly, both these causes will limit very materially the purchase of gasoline by the automobilist and will

(Continued on page 22)

DON'T HANDICAP YOUR HORSEPOWER

A motor grader without power on the front wheels is like a draft horse with roller skates on his front feet.



YOU ASKED FOR IT

THE NEW "88-M" Austin-Western MIDDLE WEIGHT POWER GRADER



● This new A-W Power Grader embodies every feature of the famous heavy-duty "99-M" needed to provide an outstanding medium weight machine... the extra power of All-Wheel Drive... the greater maneuverability of power-operated All-Wheel Steer... the speed, economy and efficiency of Precision Side Shift and Controlled Traction.

The unrivaled champion of the middle-weight power grader field, the "88-M" has

ample blade pressure to handle a wide variety of construction and maintenance jobs with new economy and efficiency. Only a "99-M" can equal its versatility on grading, ditching, scarifying, mixing, and back-sloping operations.

Write for the specifications on this newest Austin-Western power grader.

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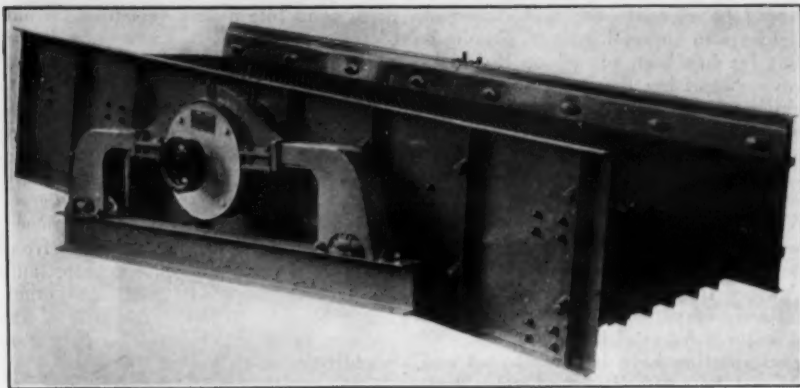
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COMPACT—POWERFUL—SAFE
Manufactured in 2, 5 and 15-Ton Sizes.
For capacity comparison, ½" cable used:
2-Ton "Lightweight" 75 ft.
5-Ton "General Utility" 250 ft.
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Patent instant gear change and positive internal brake that never fails, and will lock load.
Gear Ratios Weight Price, f.o.b. Seattle
2-Ton 4, & 22 to 1 60 lb. \$ 50
5-Ton 4, & 24 to 1 110 lb. \$ 75
15-Ton 4, 19 & 109 to 1 680 lb. \$250

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The new Robins Style M vibrating screen.

New Vibrating Screen Announced by Robins

The new Style M Robins-Vibrex screen recently announced by the Robins Conveying Belt Co., Passaic, N. J., is a high-speed unbalanced pulley-type vibrating screen designed to stand up to overloads, the manufacturer states.

This new screen has a number of features designed to save power, lubricant, screen cloth and general maintenance costs. Oil-lubricated bearings are super-sealed by means of double-action flingers and completely welded splash and dust guards. The inclination of the screen, amplitude of vibration and operating speed may all be varied in order to obtain maximum flexibility of application.

The rigid horizontal base is suitable for floor mounting, and the panels are rubber-cushioned and maintained under arched transverse spring tension, thus keeping the cloth drum-tight to eliminate failure through whipping and crystallization of the wires. Short interchangeable easy-to-handle sections make for economy in replacement. The sharp vibrating action is produced by adjustable counterweighted arms, and the manufacturer states that the elimination of flywheels and the use of oil-lubricated bearings keep power requirements down.

A new bulletin No. 118, describing and illustrating the Style M Robins-Vibrex, the latest addition to the family of Robins screens, may be secured by those interested direct from the manufacturer.

Welding Processes For Particular Metals

A new 55-page booklet, "Welding Procedures," has recently been published by Air Reduction, 60 East 42nd St., New York City, presenting in clear, straightforward language the proper welding process to be used for a particular metal under various circumstances. In addition to recommending the process, the book recommends the best filler metals to be used for each process and describes specialized welding techniques not commonly known. In an appendix, data is given for the calculation of electrode and gas welding-rod consumption for different types of welds; also comparative welding record sheets for tabulating data that will determine the best welding method for a particular job.

Metals are grouped alphabetically under such headings as Die Cast Metals,

ticularly fitted, the operator will be able to produce better welds at less cost, it is stated.

Single copies of this informative booklet may be obtained by writing direct to the manufacturer and mentioning this item.

Bulk Handling Conveyors

A new Rex bulk handling conveyor catalog has recently been issued by the Chain Belt Co., 1666 W. Bruce St., Milwaukee, Wis., containing information and pictorial descriptions of Rex belt conveyors, apron conveyors and bucket elevators. Entitled "If You Want to Get More From Your Present Plant... Here's How to Handle It!", the catalog presents three master keys to more efficient bulk handling, one or all of which, according to the manufacturer, may prove to be the solution to your particular problem.

Copies of this bulletin, No. 410, may be obtained by writing direct to Chain Belt and mentioning this item.

Revised and New Editions Of A.I.S.C. Specifications

A revision and a new edition of two of its important and widely used documents have been announced by the American Institute of Steel Construction, 101 Park Ave., New York City. These are, (1) Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings, Revised July, 1941, and (2) Code of Standard Practice for Steel Structures other than Bridges, Revised August, 1941.

Rather extensive revisions have been included in the new issue of the Specifications embracing such matters as materials, loads and stresses, unit stresses, design, fabrication, erection and inspection. The Code has been revised only in that part relating to weights of standard fillet welds, and contains the standard contract forms used by the members of the industry.

Copies of either document may be obtained by writing direct to the Institute. Price: 10 cents.



For long rope life make certain your sheaves are of hard, wear-resisting metal. Soft sheaves wear rapidly. Once worn (and often corrugated) they both pinch the rope and develop a filing action. *Never put a new rope on a worn, scored or corrugated sheave.* Select the proper sheave material, depending on the rope pressures encountered. Any American Cable engineer will gladly give you the benefit of his long experience.

And sheave diameters are very important too.

If the sheave is too small, the sharp bend imposed upon the rope induces high bending fatigue and early rope destruction. To appreciate the importance of using correct diameters note that a 1" rope of 6 x 7 construction requires a 42" sheave while a 1" rope of 6 x 41 construction requires but an 18" sheave.

For average operations here is a table setting forth the proper minimum sheave diameters for ropes of varying constructions:

for 6 x 7 Construction	42 times diameter of rope
for 6 x 19 Seale Construction	34 times diameter of rope
for 6 x 16 Filler Wire Construction	30 times diameter of rope
for Flattened Strand (Type B & G)	30 times diameter of rope
for 8 x 19 Seale Construction	26 times diameter of rope
for 6 x 19 Filler Wire	26 times diameter of rope
for 6 x 22 Filler Wire	23 times diameter of rope
for 8 x 19 Warrington	21 times diameter of rope
for 8 x 19 Filler Wire	21 times diameter of rope
for 6 x 37 Seale	18 times diameter of rope
for 6 x 41	18 times diameter of rope

Paying attention to your sheaves pays dividends in longer rope wear, less trouble and steadier production. Specifying TRU-LAY PREFORMED pays dividends in the same way. Consult your nearest American Cable wire rope engineer. All American Cable ropes made of Improved Plow Steel are identified by the Emerald Strand.

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ESSENTIAL PRODUCTS... AMERICAN CABLE Wire Rope, TRU-STOP Emergency Brakes, TRU-LAY Control Cables, AMERICAN Chain, WEED Tire Choles, ACCO Malleable Iron Castings, CAMPBELL Cutting Machines, FORD Hoists and Trailers, HAZARD Wire Rope, Yacht Rigging, Aircraft Control Cables, MANLEY Auto Service Equipment, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & CADY Valves, READING Electric Steel Castings, WRIGHT Hoists, Cranes, Presses... In Business for Your Safety



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A Dike Strengthens Continental Divide

O. E. Miller, Dirt Mover, of Milbank, S. D., Builds Dike And Highway Fills at South End of Lake Traverse

(Photo on page 52)

IT is now certain that the waters from Lake Traverse, between Minnesota and the Dakotas, will flow north and maintain the shallow lake and marsh area instead of spilling over the low Continental Divide into the Mississippi River watershed. A dike averaging 10 feet in height and involving two highways was completed at Browns Valley, Minn., last summer at the extreme southern end of the Lake Traverse-Bois de Sioux project of the U. S. Engineer Department, by O. E. Miller of Milbank, S. D.

Minnesota Highway 27 runs south from Wheaton and intersects Minnesota Highway 28 just west of Browns Valley. This latter highway crosses into South Dakota, becoming S. D. 10. Minnesota 27 has been raised an average of 5 feet by moving 24,429 cubic yards of borrow onto it, and Minnesota 28-S. D. 10 has been raised a maximum of 8 feet with 45,350 cubic yards of borrow. Both roadways are 32 feet wide. The dike extending between these two highway fills is 9 feet high, built 1 foot higher to allow for shrinkage and settlement, has a 10-foot crest, and contains 89,542 cubic yards of fill. The south or downstream slope of the dike is 1 on 4, and the north or lake-side slope is 1 on 4 for the top 5 feet and then 1 on 15 to the toe.

Stripping

Stripping was not required on the area where the dike was to be placed and only the removal of vegetation was involved. In the borrow pits the stripping was carried to a depth of 6 inches and the good top soil stockpiled for the 8-inch top-soil cover on the 1 on 4 slopes and for the top of the dike. A total of 26,769 cubic yards of stripping to a depth of 6 inches was required in the borrow pits, but most of this was salvaged and 7,717 cubic yards used 8 inches thick normal to the slope of the dikes for top soil.

A Self-Draining Borrow Pit

All borrow for building the dike came from the area between the dike and the southern end of Lake Traverse, while the road borrow came from the side hills.

Specifications required that all borrow be made not higher than within 1½ feet of ground water but, by the method devised by the contractor and Assistant Resident Engineer, it was possible actually to borrow below ground water elevation. A 100-foot berm was required between the toe of the dike and the edge of borrow. Then figuring the amount of material available per station, the contractor went to the estimated back of the borrow pit and made a cut 4 feet deep and about 25 feet wide,

which carried the excavation to within approximately 1 foot of ground water. The scrapers were then worked from the outer edge of this borrow pit toward the dike, always working up hill so that any water which accumulated from rain would drain back to the trench and leave the section nearest the dike dry. This method made it possible to borrow below ground water elevation, loading the wet material first, and then running into the dry, so that a good mixture of material resulted.

Building the Dike

The contractor was required to place the lifts on the dike in 6-inch layers and compact them with sheepfoot rollers. No moisture control was required except that the specifications stated that



C. & E. M. Photo

An Austin-Western 99 power grader working on the slopes of the dike at the south end of Lake Traverse in Minnesota.

the moisture content could not be more than 2 per cent over the optimum moisture as determined by the engineer.

Three Gar Wood hydraulically operated scrapers were used to move the material from the borrow pit to the dike. There were two 15-yard scrapers pulled by Allis-Chalmers HD-14 tractors and a 12-yard Gar Wood scraper pulled by an Allis-Chalmers Model L tractor. An-

other Allis-Chalmers Model LO tractor was used in the borrow pit as a pusher. The average haul was less than 400 feet for these tractors and they worked two shifts, totalling 16 hours per day, and averaged a production of 4,000 yards in the two shifts. The slopes of the dike were trimmed by an Austin-Western 99 power grader. The sheepfoot rollers

(Concluded on page 25)

There's Life in the OLD BABY YET★



★ 11 years of hard service already under its belt and still battin' out big yardage for its owner in tough West Virginia rock.

THEW-LORAIN Customer Protection

Thew-Lorain engineers are developing continuously improvements and refinements to make Lorains even better units.

As these improvements are developed, it is Thew-Lorain's policy to design them, often at extra expense, so that they are applicable to as many machines outstanding in the field as possible.

Thus many of the improvements on the newest Lorains can be had for your machine. As you order repair parts, you often will receive newly designed and improved parts instead of the original and obsolete design.

To keep your Lorain right up-to-the-minute and offer you every new operating advantage, every chance to cut costs and maintenance, to keep you from having an out-of-date unit—and more important than anything else today, to "Keep 'em Digging"—that is what is meant by CUSTOMER PROTECTION.



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Equipment Efficiency On Soil-Cement Job

D. W. Winkelman Co. Used Continuous Processing for Apron Paving at Air Field in New England

(Photos on page 52)

† CONTINUOUS processing as developed by the D. W. Winkelman Co., contractor for the apron paving at a new air field in New England, resulted in completing 82,744 square yards of soil-cement processing 6 inches deep in a total of nine days, exclusive of placing the tie-down anchors, clean-up, etc., not all of the work being done on a 24-hour basis. The contract was awarded by the U. S. Engineer Office, Providence, R. I., and work started June 12, 1941, with 30 days allowed for completion. Several days were lost because of inclement weather, but the job was cleaned up June 26.

The Job

The contract called for soil-cement aprons 1,600 feet long and 400 feet wide, using 0.63 bag of cement per square yard in processing and an optimum-moisture content of 10.3 per cent by weight. The specifications called for a pressure of 75 pounds per square inch on the sandy soil which was the base material for the soil-cement processing.

Planning the Job

When the D. W. Winkelman Co., of Syracuse, N. Y., was awarded the contract for the soil-cement apron paving at this airport, the first problem was to lay plans for improving the processing methods which they had used the two preceding years on road and airport soil-cement work. Andy Shearer, with five years of soil-cement experience to draw on, decided that line production was probably the best way to handle the job, using continuous processing methods. In this way it was thought that efficient high production could be obtained.

As the contractor looked at this type of work, the usual methods of processing require a large amount of equipment, none of which is worked continually through the day. Such non-

producers as a large fleet of cement-spreading trucks working only a few hours in the morning, and the steel-wheel rollers working only the last few hours in the evening, just had to be eliminated to decrease production costs and increase efficiency. It was felt that mixing should also be done continuously and in a manner to minimize the shaping operations. Water application, the bottleneck on most jobs, should be carried on continuously during the day and thus cut down the number of sprinkling units required. These were the thoughts on the work from cement spreading to final rolling.

Doing the Work

As the system worked out, D. W. Winkelman Co. cut down its equipment to three



Continuous production methods meant large areas being cured under Sisalkraft paper throughout the job at a new air field in eastern United States.

trucks hauling cement; one spike-tooth harrow spreading cement; two 75-inch Pulvi-Mixers on dry-mixing of soil and cement; two pressure distributors applying water; three Pulvi-Mixers on the moist mix; one sheepsfoot roller for initial compaction; one blade grader for smoothing; one drag broom and tandem

roller for finishing. The spike-tooth harrow used for cement spreading was also used to cut out any compaction planes produced during sheepsfoot rolling and shaping. Small garden rotary tillers were used to mix the end areas, which invariably delay production when the

(Concluded on page 29)

WAR SPEED-UP

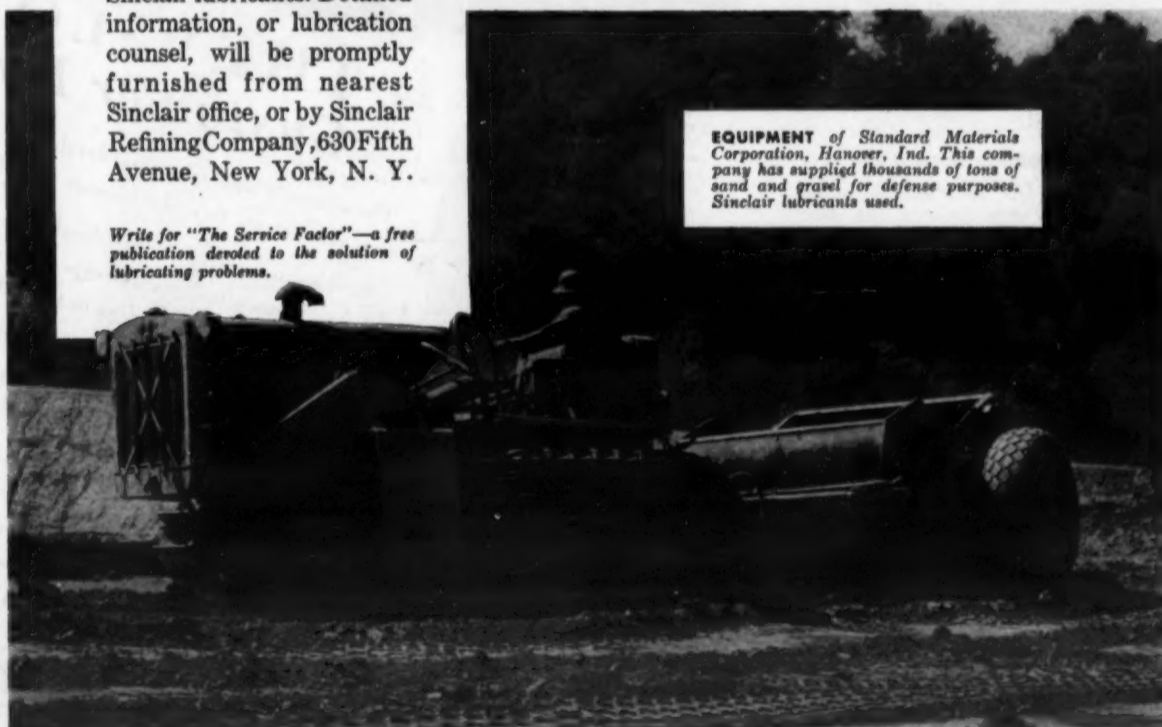
cannot be safely maintained with inadequate lubrication. For the safe lubrication of **CONSTRUCTION MACHINERY** there are...

... **SINCLAIR PENNSYLVANIA and OPALINE MOTOR OILS**, also specialized gear oils and greases promoting top yield of continuous service hours under the most punishing operating conditions. For stepped-up machine output and stepped-down shop costs try Sinclair lubricants. Detailed information, or lubrication counsel, will be promptly furnished from nearest Sinclair office, or by Sinclair Refining Company, 630 Fifth Avenue, New York, N. Y.

Write for "The Service Factor"—a free publication devoted to the solution of lubricating problems.



EQUIPMENT of Standard Materials Corporation, Hanover, Ind. This company has supplied thousands of tons of sand and gravel for defense purposes. Sinclair lubricants used.



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PORTABILITY

Out in the West asphalt plants are moved frequently and over long distances. It is not unusual for a plant to produce 100,000 tons between April and November and be dismantled, moved and set up six different times.

Madsen engineers know how to give you more portable asphalt plant equipment—No restrictions are imposed upon capacity as a result of greater portability. You will find a certain neatness of design, directness of purpose built into the character of Madsen asphalt plant equipment—from their smallest plants up to the big 3-ton batch units.

MADSEN
IRON WORKS
HUNTINGTON PARK, CALIFORNIA

Galion's Part in War Effort

Galion road machinery is playing a major role in the war effort, not only in the building of much needed highways, but in preparing the ground work for airports, factories, cantonments, dams and housing projects. Being proud of the part it is playing, Galion Iron Works & Mfg. Co., Galion, Ohio, has prepared a booklet showing by means of illustrations just what various Galion units are doing on a variety of jobs throughout the country.

Copies of this booklet, entitled "Our Part In National Defense," may be ob-

tained by writing direct to the manufacturer and mentioning CONTRACTORS AND ENGINEERS MONTHLY.

Calendar Has Truck Data

The 1942 edition of "Miss Federal", the attractive calendar of Federal Motor Truck Co., Detroit, Mich., contains twelve strong and true statements about the value of the trucking industry to the nation in general. The weights and measures table of trucking payload items so popular in last year's calendar has been retained.

Frank A. Johns, Advertising Manager,

Federal Motor Truck Co., informs us that a limited quantity of these 1942 calendars with the attractive picture of Miss Federal has been set aside for readers of CONTRACTORS AND ENGINEERS MONTHLY. Write direct to Mr. Johns on your business stationery, mentioning this item, and you may secure a calendar.

Expansion by U. S. Rubber

Two steps in the expansion of U. S. Rubber Co., New York City, have recently been announced. A new factory for the exclusive manufacture of improved types of asbestos yarns and

fabrics is to be constructed in Hogansville, Ga. In the same city the company has purchased the Hogansville plant of the Calloway Mills together with its equipment. This will enable U. S. Rubber to make substantially all of its own duck for belting, hose and other mechanical goods. The 400 workers of this factory will be retained on their jobs and it is probable that others will be employed.

The new asbestos structure, to be erected on land owned by the company, is required to meet the rapidly growing demands for asbestos products sold under the trade name Asbeston.

BUILT TO TAKE IT



• Where the going is rough and tough, "Caterpillar" Diesel Tractors prove their ability to take it. This "Caterpillar" Diesel D8 is bulldozing rock in Jacumba Pass, California.

"CATERPILLAR" Diesel Tractors, Engines and Motor Graders aren't looking for soft jobs or push-overs. They'll take on all comers—stand toe to toe and slug it out to a finish.

Rugged strength and stamina are built into every "Caterpillar" Diesel product from the ground up. Those qualities, along with sound engineering design, have enabled "Caterpillar" Diesel equipment to lick the toughest defense construction jobs in the country.

One example of built-in "Caterpillar" quality is the "Hi-Electro" hardening that gives cylinder liners and crankshafts more wear-resistance than can be had by any

other practical heat-treatment method. In the famous "Caterpillar" Diesel track-type Tractors, "Hi-Electro" hardening adds longer life to track roller-rims and shafts, track pins and other important parts.

The "Caterpillar" Diesel DW-10 Wheel Tractor, husky newcomer in the line, has the same dependable engine, the same strength and simplicity of design. It adds the speed for long, fast, heavy hauls.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

FOR VICTORY—Our armed forces have first call on "Caterpillar" production. We thank customers who have suffered delivery delays by giving clear right-of-way to our Victory efforts.



• The "Caterpillar" Diesel DW-10 Tractor can start and fill an 8-yard scraper or walk off with a big payload at 18 miles per hour. "High-traction" differential. High clearance. Heavy-duty constant mesh transmission. Five speeds forward. Scientific weight distribution that gives super-traction for every use.

CATERPILLAR DIESEL

ENGINES AND ELECTRIC SETS • TRACK-TYPE TRACTORS • WHEEL TRACTORS • ROAD MACHINERY

Concrete Paving on New Boulevard Route

(Continued from page 2)

crown of the base. This material was produced by an Austin-Western crushing and screening plant powered by a truck-mounted Caterpillar D13,000 diesel power unit. A Lorain 75A dragline in the pit close by fed the hopper direct through a 6-inch grizzly with a reciprocating feeder from the hopper to the main belt of the plant. This plant was operated by Whitmas & Borg.

Batching in Old Borrow Pit

All concrete aggregate was produced by Central States as described in the accompanying article, stockpiled for 24 hours at the plant, and then hauled to the batching plant, about 3 miles distant, located in an old borrow pit at approximately the center of the job. A Northwest crane with a 45-foot boom and 1½-yard Owen clamshell bucket kept the wooden bins of the Johnson weighing batchers filled. A Johnson bulk-cement batching plant was located in the pit at the side, so that the cement could be delivered by the steel tank trucks to the top of the plant and the batch trucks could drive in at the bottom for their weighed batches. The contractor used 2-batch trucks throughout, running an average of eight, a maximum of twenty-two and a minimum of four. These trucks alternately ran in forward, and backed in beneath the aggregate batchers, so that the gravel would strike the bed of the truck at a different point each trip, scouring it and preventing damp sand sticking.

Only two men were required for handling the cement from the box cars at the siding as they were run onto a trestle and the men used a wheeled coal scoop, pushing the cement into a hopper which delivered it direct to the hauling trucks.

All of the batch trucks were hired locally, and after they had received the load of cement they drove by a platform where one man stepped onto the load and covered the cement with the aggregate. The batch weights were as follows:

Stone, 2½-inch to No. 4 mesh.....	2,482 pounds
Sand	1,543 pounds
Cement	522 pounds

These weights were corrected for 4 per cent excess in the material passing the No. 4 mesh in the coarse aggregate, so that the rock weight was increased to 2,585 pounds and the sand weight decreased to 1,240 pounds.

Water Supply Won the Job

When contractors were going over this job, preparatory to making their bids, they found the great problem was the question of water supply. While there were a number of lakes and streams nearby, it was impossible to get an adequate supply from any nearby lake because of injunctions. The cost of hauling water in tank trucks was considered prohibitive and in fact did prove so to most of the bidders. Central States Construction Co. located a spring, just off the right-of-way, flowing through the woods, which they considered adequate for the job and so bid it.

A dragline was put in, excavating a reservoir below the spring measuring about 20 x 50 feet in area and some 10 feet deep. A Novo triplex pump and a Domestic triplex pump were installed, delivering the water through 2½-inch steel spiral weld pipe laid along the shoulder or in the boulevard area so as not to interfere with traffic. Valves were placed in the line about 300 feet apart, and the paver carried 200 feet of hose.

Fine Grade and Forms

After the 3-inch top course of gravel had been spread by a Caterpillar No. 12 power grader, a Warco 15-30 power



C. & E. M. Photo
The Koshing paver just before the sledge swung over to clean the skip at the top of its travel.

grader cut the form trench and moved any excess gravel from the balance of the grade. Two form setters with two helpers set the 9-inch Metaforms, following which two men thoroughly tamped the base to insure stability when the heavy finishing equipment passed

over them. The fine-grade crew consisted of five men who worked with the Lakewood subgrader, which was pulled over the forms by an International TD9 with a Bucyrus-Erie bulldozer. When the excess material had been removed by hand shoveling, the grade was com-

pacted with a Huber 7-ton roller. The grade was sprinkled just ahead of the paver and the forms were oiled by a member of the fine-grade crew.

Reinforcing and Joints

The reinforcing provided by Minnesota design consists of a ¾-inch deformed round bar running longitudinally 10 inches either side of the center joint of the pavement. To this, 24-inch tie bars of ½-inch deformed round bars are tied, spaced 3 feet apart. During pouring this center-joint assembly is held 2½ inches from the subgrade by long-handled removable chairs.

Expansion joints are placed in the pavement 120 feet apart with contraction joints every 20 feet. The contraction-joint steel assembly is made in half-width sections and comprises a ¾-inch round deformed bar on either side of the joint and spaced 6 inches either side thereof. The dowels which transfer the load across the joint are ¾-inch round bars 15 inches long, oiled for the full

(Continued on page 30)

The Use of X-Ray In Testing Welding

The application of X-ray examination of welds has resulted in a great improvement in the quality of welded joints by showing up any defects resulting from entrapped slag, porosity, incomplete fusion, and cracks. In welds, as in castings which are also being tested by X-ray, the examination reveals the presence and nature of internal defects not discernible on the surface. As the X-ray beam passes through the material, it produces a shadow picture of the specimen. Variation in the shadow intensity indicates lack of uniformity in the material, and the cause of the non-uniformity can be deduced. Flaws amounting to as little as 2 per cent of the total thickness, even as little as one-half of one per cent in favorable cases, can be detected, it is reported.

Welds apparently perfect in surface appearance may have an area of poor fusion which will result in failure in service. If such a weld is examined



C. & E. M. Photo
Loading a 12-yard Adams hauling scraper with a D8 pulling and a D7 pusher tractor on the Whitmas & Borg grading operation on U. S. 53 north of Duluth, Minn.

merely by sectioning, this defect might be missed and the welding called satisfactory. The X-ray beam shows when the process is not adequate, and a change in technique can be made which will produce perfect welds.

This type of X-ray test for welding was used for the penstocks at Boulder Dam and is being used at the fabricating plant for the penstocks for Shasta

Dam in California, all welds having to pass the X-ray test before being accepted by the Bureau of Reclamation.

Further information on the application of X-ray for testing welds and descriptions of the Keleket X-ray equipment for making such tests may be secured direct from the Kelley-Koett Mfg. Co., Inc., Covington, Ky., by mentioning this item.

Dirt Scrapers Handle Boulevard Grading Job

(Continued from page 2)

planning by these contractors who were awarded the work on their joint bid of \$304,939 made possible the early opening of the new boulevard highway on Minnesota-U. S. 53.

The contract was awarded in 1940, and the major grading during the first year of operation was to create a parallel grade adjacent to the existing 24-foot bituminous roadway which then comprised U. S. 53. During the second year grading was largely confined to the placing of the insulation course over the old roadway and to opening up a short length of new location at the north end of the project. This article is devoted to the work on the new location.

In this section about 100,000 cubic yards of material was moved in a distance of about 1/2 mile in a clayey top soil with just enough niggerheads to slow down traction, and some particularly soft spots. Whitmas & Borg worked a 12-yard Adams hauling scraper with a D8 tractor and a 12-yard LeTourneau Carryall also pulled by a D8 tractor. A D7 tractor with a LeTourneau bulldozer was used as a pusher for loading the scrapers, which had a haul varying from 400 to 500 feet. The bulldozer was also used to maintain the hauling road, filling the ruts over the soft spots and working boulders too large for the scrapers to handle out of the grade and to one side.

This work was done by Whitmas & Borg of Duluth, Minn., with Frank McElwee as Superintendent, and G. M. Christilaw was Resident Engineer for the Minnesota Highway Department.

Ethyl Merges All Services

All of the technical services of the Ethyl Gasoline Corp. have been merged into a single unit which will function in close cooperation with the government and with the petroleum and automotive industries. A War Committee to adapt research facilities to the needs of the armed forces has been formed also.

Julian J. Frey of Detroit has been appointed director of the new Technical Service Department and chairman of the War Committee. The Bus and Truck Division, of which Errol J. Gay will be manager, forms an important part of the new department. Mr. Gay will work with fleet operators and heavy-duty engine manufacturers, as well as with the Army, in carrying out a program which aims at better utilization of fuels and more efficient operation of motor vehicles.

Other divisions embraced in the new department, and their heads, are: Gasoline Testing, John Clifford Pope; Passenger Car and Automotive Accessories, Richard K. Scales; Refinery Technology, William H. Hubner; Agricultural, C. G. Krieger.

Members of the War Committee, in addition to Chairman Frey, are: Earl Bartholomew, Dr. George Calingaert, Dr. Graham Edgar, S. D. Heron, and Dr. O. E. Kurt.

Special Crane Bulletin

Bulletin G-4120, recently issued by The General Excavator Co., Marion, Ohio, is a temporary bulletin containing the last minute specifications of the General Model 307 Supercrane. This is a self-propelled, hydraulically steered, one-man-operated crane mounted on rubber tires offering certain advantages over truck crane operation.

Full details will be found in the bulletin mentioned above which may be secured free from the manufacturer by mentioning this item.

SPEED UP WAR CONSTRUCTION!

Plants that are needed fast are being built faster with these SKILSAW TOOLS! Here are the saws and drills that play so big a part in the greatest construction program the world has ever seen—helping build cantonments, war-material factories, defense housing projects—making each hand do the work of many—stretching each hour over more work done!

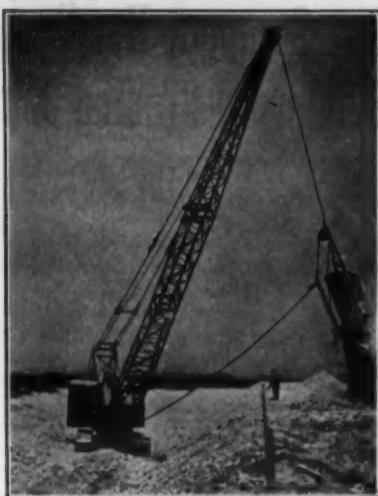
SKILSAWS will speed all your sawing on every size of lumber you use—9 powerful models. SKILSAW DRILLS will give you more holes per hour in lumber and steel—23 models. Ask for a demonstration and you'll see why 9 out of every 10 defense contractors use SKILSAW TOOLS!

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These Skilsaw Tools
Save Days and Dollars
For Victory!



Excavating compacted gravel with a P & H dragline at Santa Fe dam site.

Dragline Operation In Compacted Gravel

Sustained high-speed production of over 2,000 yards per 8-hour shift in the rough gravel site of tightly compacted boulders at Santa Fe Dam in Los Angeles County, Calif., has been reported by the Harnischfeger Corp., Milwaukee, Wis. The P&H 955-LC excavator in service there is equipped with an 80-foot boom and a 2½-yard heavy dragline bucket. The manufacturer attributes the high production of the machine to its fast line and swinging speeds.

After completing its dragline service the P&H machine is to be equipped with a 90-foot boom and concrete bucket for work on the spillway section at the site.

Broken-Stud Problem Solved by Welders

A difficult problem often encountered by mechanics and machinists is that of the broken stud bolt. A practical solution of this problem has been devised by two New York welders, William F. Kramer of the Bronx and Alex F. Morton, of Brooklyn.

After a year's test, this method was found to be twenty times as fast as the previous procedure involving drilling. Believing that it would be a great contribution to the war effort if this method were known to maintenance officials and mechanics everywhere, they have passed on the details of this method of handling

the broken stud bolt problem to all users of equipment or machinery.

The new technique involves the use of arc welding. When a series of stud bolts are sheared off in a casting, the welders place nuts in a position above the broken studs and center them. In each case the inside diameter of the nut is slightly larger than the outside diameter of the broken stud. By means of the electric arc, the studs then are built up to the nuts by laying on several layers of weld metal. Then the nuts are welded to the studs.

Where a number of studs have been broken, Morton and Kramer advise welding them all before removing any. This permits the heat from the arc to accumulate in the casting, expanding it and in most cases making removal of the studs as easy as the removal of an ordinary nut from a bolt by means of a wrench. It is reported that about twenty broken stud bolts can be removed in an hour by this method.

The details of this method for using arc welding in the removal of broken

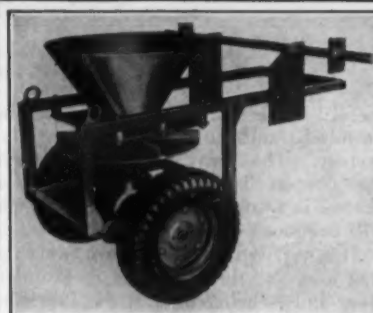
stud bolts were furnished by the Lincoln Electric Co., Cleveland, Ohio, manufacturer of arc welding equipment.

Tree Trimming Equipment

An important maintenance activity of every state and local highway department is the careful trimming of trees at intersections and curves to prevent the blinding of motor vehicle drivers by

short sight distances. Catalog No. 27, issued by Bartlett Mfg. Co., 3003 E. Grand Blvd., Detroit, Mich., gives a complete listing of Bartlett compound lever tree trimmers, combination pruners and saws and other utility equipment for quick and effective work.

Copies of this catalog will be furnished free to readers of CONTRACTORS AND ENGINEERS MONTHLY who write to the manufacturer and mention this item.



NEW SANDER LAKESHORE Sand Slinger

for icy
highways
and airport
runways

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400 W. Laketon Avenue
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Attach to any
truck. Drive any
speed from 4 to
20 m.p.h. Sands
evenly an 18-foot
strip.

Speed Up Construction of "Defense Roads" with Littleford Equipment



Littleford "Spray Master" Pressure Distributors are the most efficient Tar and Asphalt Spraying Units made today. One valve stops and starts the spray—no gadgets, no valves to slow up the operator. Speed in construction is what we need today, and the "Spray Master" will give it. Send for details.



Littleford Supply Tanks haul the materials to the Distributors. No need to waste valuable time on vital roads when a Littleford Supply Tank can keep the Distributor going every hour of the day. Littleford Supply Tanks made by the new Frameless Construction Method saves you money. Write for further information on Littleford Frameless Construction Supply Tanks today.

Make ROADS SAFE



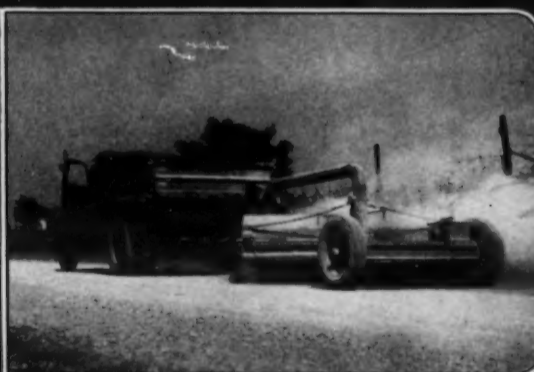
BY removing slush and ice from paved and black top roads with a BURCH TRUK-PATROL. It is also invaluable for road and shoulder maintenance. Many new and exclusive features such as Hydromotor moldboard control, center draft, draft bar attached to a front frame hitch that can also be used for Ross snow plows.

Write for Bulletin B.T.P. 1

Manufactured by
The BURCH CORPORATION
Crestline, Ohio
Builders of Equipment for over fifty years



The Trail-O-Roller is the Portable-Motorized Roller that can be taken to dozens of jobs in a single day. Trails behind any truck at any speed. Makes access roads permanent. We need roads open at all times, so "Keep Them Rolling" by rolling patches with a Trail-O-Roller. A rolled patch is in to stay.



Make roads' dust and dirt free before applying tar or asphalt by using a Littleford Power Driven or Traction Driven Road Broom. These Brooms help to make roads permanent. After sweeping, the applied materials penetrate the old road surface and adhere permanently. Littleford Road Brooms are the most modern units available. Perfectly balanced, sturdy construction.



LITTLEFORD

LITTLEFORD BROS., INC.
485 E. Pearl St., CINCINNATI, OHIO

New 60-Foot Arch Span On Indiana-U.S. Route

Deniston & Garber Constructs a New Concrete Arch Bridge Over Croy Creek on U. S. 40 Dual-Lane Project

(Photo on page 52)

† FEDERAL-Aid Project 6B (4) is one of a series of projects placed under contract in December, 1940, with separate contracts for the grading and paving of 4,899 miles and for a 60-foot span concrete arch bridge west of the Clay-Putnam County line in Indiana. The contract for the bridge was awarded to Deniston & Garber of Rochester, Ind., on the bid of \$33,956.26.

Inasmuch as there was considerable need for local traffic, and a large volume at that, to use the highway during construction, the bridge contractor built the south section of the arch structure first so that local traffic could use the old bridge. Then when the south section had cured and could be opened to traffic the old bridge was removed and the north section of the new bridge poured. The arch bridge has a single clear span of 60 feet with a rise of 17 feet and crosses Croy Creek.

For concreting, the contractor stockpiled all of the aggregate on the higher side of the bridge and set up a Jaeger 14-S mixer and Johnson scales for weighing the aggregate in rubber-tired wheelbarrows. By a judicious use of runways, the contractor was able to pour all of the concrete with rubber-tired concrete carts, without the use of a crane.

Quantities

The major quantities on the Deniston & Garber contract were:

Class D concrete.....	265.2 cu. yds.
Class E concrete, above footing.....	419.0 cu. yds.
Class E concrete, in footing.....	478.6 cu. yds.
Hand-rail.....	283.2 lin. ft.
Excavation, wet.....	829 cu. yds.
Excavation, dry.....	995 cu. yds.
Excavation, waterway.....	140 cu. yds.
Special filling material.....	6,055 cu. yds.
Reinforcing steel.....	94,634 lbs.
Cast iron.....	1,046 lbs.
Removal present structure.....	1 lump sum
Pavement removal.....	285 sq. yds.
Waterproofing.....	1,585 sq. yds.

Personnel

For the Indiana State Highway Commission, this bridge contract was completed under the direction of Paul Parker, Project Engineer. For the contractor, Deniston & Garber, Hubert Garber was Superintendent and Guy Lambdin was Foreman.

High-Speed Diesel Oils

As modern automotive equipment has advanced, the diesel engine of necessity has been redesigned for high-speed operation. This has created new and more complicated problems in the field of lubrication. To meet these developments The Texas Co., 135 East 42nd Street, New York City, has developed Texaco Ursa Oils X, available in several viscosities, and offered to diesel engine users after having been subjected to severe field tests involving fifty high-speed diesels of eight different makes to prove its qualifications. Although these oils were originally developed to lubricate

certain types of high-speed diesel automotive engines, they are also suitable as a universal diesel lubricant where several different grades of oil were formerly required.

The producer claims the following outstanding features for Texaco Ursa Oils X: 1. ability to keep rings free as demonstrated by the Caterpillar oil approval engine tests; 2. ability to form a protective film on bearings, making them impervious to chemical attack; 3. high dispersion properties, maintaining carbon and other sludge-forming particles in fine suspension; 4. high film strength, as determined on extreme pressure testing machines, and confirmed by actual engine tests; 5. resistance to deterioration, as indicated by the General Motors oil engine tests; 6. easy starting; 7. no water-sensitive additives, or those which cause excessive foaming.

Complete information regarding this new lubricant may be secured direct from the producer by mentioning this item.

False Bottom Gives Protection to Trucks

In order to protect the bodies of his trucks when loading rocks or frozen material and to clean out the body when handling sticky materials, William Lathers, Jr., contractor, Madison, Wis., has designed and installed a false bottom in his trucks.

These sheet-metal bottoms are attached to the forward end of the truck body by chains, and cables approximately 8 feet long are attached to the rear of the false bottom. When the body is raised for dumping, the load is deposited on the cables. The truck is then driven away with the body in an upright position and the weight of the dirt on the cables pulls the false bottom out a couple of feet from the truck bottom, freeing all dirt. The false bottom falls back into place on the bed of the truck as the body is lowered.

This eliminates frozen or sticky material adhering to the truck and the labor, expense and headaches of cleaning out



A false bottom aids speedy and clean dumping of trucks.

the body by hand shovels. This device was brought to our attention by D. A. Milligan, Equipment Sales Engineer, Cleveland Tractor Co.

HEIL HI-SPEED CABLE SCOOPS — Complete dirtmoving units consisting of 150 H. P. Heil Rubber Tired Tractor and 15-yard Capacity Heil Twin-Cable Scoop. Designed for high speed operations with hauling speeds up to 20 M.P.H. depending on road and grade conditions.

WITH HEIL ROAD MACHINERY

A Complete Line of Dependable Earthmoving Equipment to Help You Maintain High Speed Operating Schedules.

Today's high speed production schedules call for heavy duty construction equipment that will stand up under a punishing day-and-night work program. Speed and more speed is the order of the day — no matter how big the job or how tough the operating conditions may be. That's why it's important for you to have equipment

that can be depended on to see your job through 'on time' without delays and service expense.

Heil Road Machinery is built by a pioneer manufacturer of construction equipment and is designed by experts to give you efficient, dependable operation on all types of jobs. Heil offers you a complete line of earthmoving equip-

ment to choose from. You will find the right equipment for your job in the complete line of Heil Hi-Speed Tractor-Scoops, Heil Twin-Cable Scoops, Heil Trail-builders and Bulldozers, Heil Hydraulic Dump Units, and Heil Tamping Rollers. See your nearest Heil Distributor or send for illustrated catalog today... Address:

THE HEIL CO.

MILWAUKEE, WISCONSIN

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HEIL TWIN-CABLE SCOOPS — Fast operating economical Heil Twin-Cable Scoops are built in 8, 10, 15, 18 and 25-yard capacities, for operation with all makes of crawler tractors. Specify Heil Cable Scoops to insure trouble-free operation and lower cable replacement costs, regardless of the tractor you use.



HEIL HYDRAULIC TRAILBUILDERS AND BULLDOZERS — Available in sizes for mounting on all Cletrac Tractors. Heil Hydraulic system gives you instant positive control of the blade — in the up, down, float, and hold positions — to insure fast, clean-cut work.



HEIL HYDRAULIC DUMP UNITS — Heavy duty Heil dump bodies and Heil Hydraulic Hoists are available in suitable capacities for mounting on any truck chassis. See your nearest Heil Distributor for recommendations.

COMPLETE WELL POINT SYSTEMS

WILL DRY UP ANY
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The J. D. Adams Co. luncheon for the members of the Highway Contractors' Division of the Associated General Contractors of America during the Twenty-Third Annual National Convention of the Association held at Indianapolis, Ind., February 18-19, 1942.

A Few Simple Rules For Saving Rubber

By following a few simple rules during the wartime emergency, every contractor and state and county highway department can extend the life of equipment made of rubber, thereby adding to the nation's supply of this vital product, according to a recent statement by W. H. Cobb, General Manager, Mechanical Goods Division, United States Rubber Co., New York City. The recent orders rationing tire sales have emphasized the need for conserving every possible ounce of rubber for war uses. Every time a plant or an individual saves 13 1/4 ounces of rubber, for example, another gas mask is possible.

Certain general rules can be applied to all goods made of rubber, Mr. Cobb stated. Among the greatest enemies of rubber are oil, grease and gasoline, all of which are very destructive, and rubber products should be kept away from them as completely as possible. The life of a conveyor belt, for example, is often cut short by destructive operations such as unnecessary abrasion, misalignment, uncushioned impact, as well as being subjected to leaking-oil conditions. Also, rubber goods should be stored in a cool dry atmosphere and kept away from direct sunlight and high temperatures.

Rubber should never be placed in enclosed generator room or near electric motors. If the air around these contains even a minute quantity of ozone, which is created by these machines, it will have an extremely oxidizing effect on hose, belting, packing and other mechanical rubber products, aging them to abnormal degree. The actinic rays of the sun are harmful to all rubber goods, except some types of synthetics. The effect is to deaden the resiliency of the rubber, burning it almost like the sun burns human skin and in time resulting in a charred cracked surface. Excessive heat will also harden and crack the rubber and seriously affect the service life of a product manufactured from it. Therefore, avoid steam pipes and boiler rooms.

Rubber products should never be hung on nails, hooks, across boards, or any objects which might cause them to bend sharply or which might place a strain at any one point. Hose, wire and belting under permanent strain are subject to deformations which may cause them to crack or to break when under

pressure. This applies to all grades of products from the highest to the lowest quality.

Mr. Cobb also points out that it is a dangerous practice to "borrow" or substitute one type of rubber product

for purposes other than those for which it is specifically recommended, even though the particular article may seem able to "take it." Destructive action or unwarranted strain often takes place which may result in premature failure. In other words, the product should be chosen in consultation with an expert for the specific service for which it is intended.

Cork Expansion Joints Described in Bulletin

As concrete is subject to alternate expansion and contraction according to temperature changes and moisture content, to keep joints sealed in winter as well as in summer requires a material which is non-extruding and resilient. Johns-Manville SE cork expansion joints, according to the manufacturer, meet these requirements, and in addition have the property of self-expansion beyond its original installed thickness. SE cork is made from natural cork particles and an insoluble synthetic resin. These

materials are formed into sheets in various thicknesses which are then dehydrated and compressed to about 60 per cent of their original thickness. Wrapped in waterproof packages, SE cork remains in its compressed form until the covering has been removed and the material installed in the joint. Not until then does self-expansion begin.

A bound set of data sheets issued by the Johns-Manville Corp., 22 East 40th St., New York City, describes and illustrates SE cork expansion joints, presents installation methods and specifications. Copies may be obtained by mentioning CONTRACTORS AND ENGINEERS MONTHLY.

New Ransome Distributor

Midwest Equipment & Supply Co., 244 West 43rd St., Indianapolis, Indiana, has been appointed by the Ransome Concrete Machinery Co., Dunellen, N. J., as its distributor to handle the complete Ransome line of construction equipment in certain sections of Indiana.

"The Navy gave them to us for Production Excellence"



They're owned by 7000 people
who pulled together, working hard

"Out there on the Roebing staff you see two emblems. The top one, bearing the crossed cannons, is the Naval Ordnance flag. And below that is a pennant, "E" ... the United States Navy's flag of Excellence. The Navy "E" is something to be strived for—at sea, in peacetime, officers and men must work all year to reach the standard of excellence that bestows an "E" on a stack, for engineering; on a turret, for gunnery; on a radio shack, for communications. Ashore, it's given with the Ordnance flag for another kind of excellence—the kind you get from seven thousand heads and fourteen thousand hands that Roebing stands for ... Production Excellence.



When the Navy gave these flags to Roebing, they also pinned an "E" on every man-jack of the Roebing crew. You'll see it proudly worn by the men

who are today filling your wire rope needs. They're working with the pride and satisfaction of master-craftsmen, knowing they have pleased one of the world's most demanding customers, just as they'll please you.



The men who man the open hearths are putting something extra into every melt of Roebing "Blue Center" Steel. Something they gained the day they got their "E", when they watched these same hearths swallow a fragment of enemy bomb from the hand of a Naval officer, to be returned with interest to those who menace American liberty.



You'll get that "something extra" if you're in the Navy, using Roebing Wire

Rope for any one of its multitude of shipboard purposes, such as the slings that hoist a plane aboard its mother ship.

You'll get it also if you're buying Roebing "Blue Center" for any of the vital industrial uses that must go night and day, non-stop ... for logging camps, for mines or elevators, for plant hoists or oil well drilling lines. You'll get it every time you use the Roebing trade-mark as your buying guide."



Roebing Research, plant facilities; Roebing Quality Control and Engineering ... for years they've been putting extras into "Blue Center" Wire Rope. Extras that you need today, wherever wire rope has a dependable, long-lived job to do.

JOHN A. ROEBLING'S SONS COMPANY
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Ideal for Sheet Metal Shops. Speeds Production—Constant Economical Service.

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Write now for full information on our complete line. Quick deliveries.

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THAT'S THE ONLY WAY TO MAKE

ROEBLING

"Blue Center"

STEEL WIRE ROPE
PREFORMED OR NON-PREFORMED



Division 17 Garage At Sudbury, Ontario

**Equipment for Maintenance
Of 1,100 Miles of Roads and
Snow Plowing of 200 Miles
Repaired in One Garage**

♦ DIVISION 17 of the Ontario Department of Highways is spread over considerable area and includes about 1,100 miles of roads on the highway system as well as many isolated roads in the interior to the north leading from towns on the railroads but not connected with the outside road system. In these localities small graders are shipped in by rail for pulling by local teams to maintain the roads.

The main garage for the care of all equipment is on the west edge of Sudbury on Highway 17, where the Division offices are located. It is a 50 x 50-foot fireproof structure of building tile 35 feet high with a steel truss and wood roof covered with asphalt shingles. The feature which immediately attracts attention is the location of the two 13-foot high x 14-foot wide folding doors, one in the front and the other at the rear of the building. These are staggered so that large pieces of equipment may be run in straight through the front door and other large equipment run in straight through the rear door without their conflicting with each other.

Garage Equipment

At the left of the front door, as one enters, is an oil storage room, back of which is the office of the mechanic in charge, and then at the rear the lavatory and toilet. Between the office and the toilet is a flight of wooden steps leading up to storage space over the oil room and office, where extra tires are stored and batteries are recharged with a Tungal charger. Over the lavatory is stored a spare gas-engine-driven tar sprayer. The garage is heated with unit heaters supplied with steam from a boiler in the basement. Beneath this stairway is a Brunner garage compressor.

After entering the front door and turning to the right, one finds in walking around the edge of the garage a Dominion Oxweld Co. acetylene welder; a Black & Decker electric hand drill rigged

as a drill press; a Manley 25-ton hydraulic press; a work bench extending nearly halfway down the side of the building, covered with sheet metal and equipped with drawers and cupboards beneath for storage of tools and medium-sized parts. Then comes a Black & Decker bench grinder; and, between the two sets of sheet-metal-covered benches, is a set of wood bins carefully marked for the storage of nuts, bolts, cotter pins, and washers. Here also is an air trigger blower for cleaning parts. At the back of the garage is a 45-gallon metal tank containing a cleaning solution for removing oil and grease from parts which are being repaired. For handling engines and other heavy parts from trucks and equipment, a rolling frame is provided equipped with a heavy chain fall. The



C. & E. M. Photo
The Central Garage of Division 17 at Sudbury, Ontario. A feature of the building is that the front and back doors are not opposite which makes the parking of equipment easier.

basement is reached by a flight of stairs at the back of the garage going down beneath the lavatory.

Other Buildings

Extending from the front of the wire-fence-enclosed yard is a series of buildings which are used effectively for storage and for various work operations.

Next to the road is a carpenter shop with a connection to a 124 x 40-foot storage garage of four stalls, and at the end next the carpenter shop a storage room with carefully designed racks for shovels, rope, and chain, shelves for the storage of extra rolls of subgrade paper, hand rock drills, tongs, cant hooks,

(Continued on page 38)

FOR MODERN,
SCALE-RESISTANT
HIGHWAYS



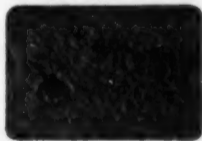
Pavement scaling has been successfully checked. Years of testing in more than a dozen northern states demonstrate that an answer has been found to this problem which now vexes all concerned with the design and construction of concrete highways.

VINSOL-TREATED CEMENT THE ANSWER

A new kind of cement—conditioned during manufacture with minute amounts of Hercules' Vinsol* Resin—is the answer. All tests to date show that concretes made from these conditioned cements are definitely more resistant to surface-scaling and the disintegration which so frequently results. In one typical test series, concrete pavement (upper) made with normal portland cement and subjected to accelerated ice-removal action, scaled over from 65 to 85% of the total slab area. Adjacent sections, made with Vinsol-treated cement, (lower) scaled over only 0 to 5% of the slab areas... in the same time and under the same rigorous conditions.

*Reg. U.S. Pat. Off.

Scaling of Typical Concretes



Normal Portland



Vinsol-Treated

These New Vinsol-Treated
Cements Give You
Truly Scale-Resistant Concrete
That's Easier to Place and Finish

EASIER WORKING, TOO

All types of frost scaling are apparently equally reduced. And, in addition, concretes made with these new cements show increased ease of placeability... are more workable... and segregation, bleeding, and the formation of pockets of mortar or aggregate are less apt to occur. These qualities permit the finishing crews to work closer to the mixer, completing the job faster.

GET THE FACTS TODAY

The facts on these Vinsol-treated cements have been proved by hundreds of tests. Cement companies, highway departments, contractors, all have verified the remarkable results these conditioned cements make possible. Many cement companies now offer special Vinsol-treated cements for construction which will be exposed to freezing temperatures. Thus, your regular cement supplier can probably give you all the information you need. If not, write us for a complete bibliography of the work to date. Address Naval Stores Department, Hercules Powder Company, 966 Market Street, Wilmington, Delaware.



BETTER ROADS AHEAD is the title of a 15-minute, 16mm., sound-and-color motion picture which documents some of the work done with Vinsol-treated cements from 1938 through 1940. If your group would like to view this film, a showing can be arranged by letter to us.

KINNEY DISTRIBUTORS

—already at work
on vital airport jobs
in the U.S.A., Cuba,
Haiti, Guatemala and
Brazil—

can help you with any bituminous surfacing job—and do it quickly and efficiently—write

KINNEY MANUFACTURING CO.
3531 Washington St., Boston, Mass.



Use "Vinsol-Treated" Cement
FOR
Reduced Surface Scaling

NAVAL STORES DEPARTMENT
HERCULES POWDER COMPANY
973 MARKET ST., WILMINGTON, DEL.

Gentlemen:
Please send information on Vinsol-treated cements.

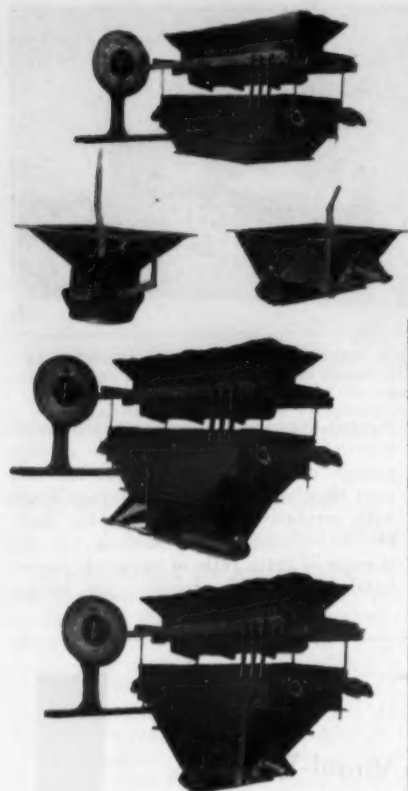
Name _____

Address _____

City _____

State _____

LL-60



Various set-ups of the new Heltzel Universal batcher.

A new Heltzel catalog shows all combinations of batching methods made possible by this Universal batcher. Copies will be sent free on request to those mentioning this item.

Special Listing of Bearings

Early in 1941, The Timken Roller Bearing Co., Canton, Ohio, began a survey of more than 2,500 bearing sizes to

determine which ones would readily fit into the military program, increase output and speed up delivery. Data on basic dimensions, rating and price of 687 bearings were compiled and published in September, 1941, in a 12-page "Defense Supplement" to the Timken Engineering Journal. Recent war developments have given the "Defense Supplement" a new significance. It has proved to be a great convenience to engineers, has contributed largely to increased output, and has helped to speed up delivery.

Copies of this supplement may be secured by writing direct to the manufacturer on your company or official letterhead and mentioning this item.

Standard of Indiana Aids Steel Conservation Drive

To aid in the conservation of steel for the American war program, the Standard Oil Co. of Indiana has appealed to its customers who receive lubricating oils and greases in steel barrels and drums to return them as soon as they



are empty so that all available barrels may be kept in circulation.

Standard is enclosing this appeal with statements or other mail to customers and is having drivers distribute them. On the steel barrels themselves, a red, white and blue label, illustrated above, states "Do your part: we will do ours. Return drums as soon as empty. Keep 'em rolling for defense".

All-Purpose Batcher Serves All Needs

A new batching unit recently announced by Heltzel Steel Form & Iron Co., Warren, Ohio, is a boon to the contractor who may operate on one job with batch trucks and on the next with truck mixers requiring entirely different batch delivery. The Heltzel Universal batcher saves the need of buying a complete new batcher for each of the various operations.

The basic unit of the new aggregate weighing device is a top or main hopper equipped with a Kron dial scale. The opening in this main hopper is square, permitting bolting on either of the interchangeable independent hoppers. One of these has a long narrow gate for loading batch trucks and can be bolted crosswise or lengthwise of the bin so that trucks can be driven from the front or from the side of the plant. The second independent hopper has clamshell-type gates and a collecting hopper with a circular opening for charging truck mixers.

★ ★ ★ ★ CHICAGO PNEUMATIC NEWS ★ ★ ★ ★

LOW MAINTENANCE COST FEATURE OF CP VIBRATORS



↑ **TOPPING TIME: 2 MINUTES!** Here are eight yards of concrete and four men with two CP-518 Vibrators. The second picture was taken two minutes later. Note the concrete is topped off—a typical performance with the CP-518, a two-man vibrator for concrete batches of 2 cubic yards or more; ideal for knocking down and compacting heavy, hardest concrete in open forms—gravity dams, large bridge piers, mats, etc.



1.7 MILLS PER CUBIC YARD TYPICAL REPAIR PARTS COST

Used on Many Large Dam Jobs

NEW YORK—On practically every outstanding construction project—Grand Coulee, Marshall Ford, Ruby, Friant, Shasta and Hansen Dams, Baton Rouge Bridge, Delaware River Aqueduct—Chicago Pneumatic Concrete Vibrators have shown remarkably low maintenance costs. A typical record is that made on one large dam job: four CP-518 Vibrators placed a total of 312,000 cubic yards of concrete—approximately 75,000 cubic yards per vibrator—at a cost for repair parts of 1.7 mills per cubic yard. Complete data on the seven models of CP Concrete Vibrators, Pneumatic and Electric, will be forwarded upon request.

**CHICAGO PNEUMATIC
TOOL COMPANY**

General Offices: 8 E. 44th St., New York, N. Y.

**ASBESTOS
BRAKE LINING
CLUTCH FACINGS
AND FRICTIONS**

that
HIT SPOT
the



For 27 years GATKE has sought tough jobs and developed materials to master them.

That's why GATKE Swing Frictions, Brake Lining and Clutch Facings dominate where the going is tough.



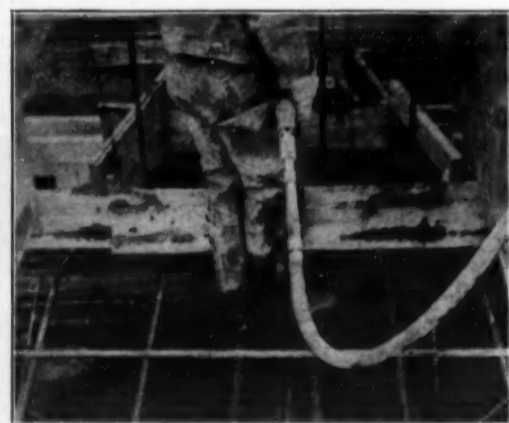
**ASBESTOS PRODUCTS
FRICTIONS - BRAKE LININGS
CLUTCH FACINGS - FABRIC BEARINGS
GATKE CORPORATION 224 N. La Salle St., Chicago**

Whatever your service, just tell us what you need.



↑ **FOR LIGHT REINFORCED CONCRETE SECTIONS, 3" slump and over, there is no vibrator faster or cheaper to operate than the CP-219. For walls and columns under 15" thick, light floor and roof slabs.**

← **FLUSHING MORTAR** to the face of vertical key is an easy, speedy job with CP-419 Bicycle Electric Vibrator. For batches of mass concrete up to two cubic yards; medium bridge piers, mats, etc.



↑ **PLACING CONCRETE IN LOCK FOUNDATION, CP-325 Concrete Vibrator. For concretes under 3" slump; walls and columns over 15" thick; heavy floor and roof slabs; appurtenances on heavy construction jobs. Especially designed for hard service.**

CHICAGO



PNEUMATIC

CONTRACTORS' EQUIPMENT

**Air Compressors, Rock Drills, Pneumatic Tools,
Vibrators, Pumps, Electric Tools, Diesel Engines**

Roebling Receives Highest Service Award of U.S. Navy

The U. S. Navy Bureau of Ordnance Flag and the Navy "E" Pennant, highest service award of the Navy, was recently presented to William A. Anderson, President of the John A. Roebling's Sons Co., Trenton, N. J., and Navy "E" buttons to Roebling employees.

Stating that the Roebling Company has distinguished itself in the production of vital Naval ordnance materials "above and beyond the call of duty" Lieutenant Commander Warren A. Shaw, U.S.N. Bureau of Ordnance, in making the presentation said, "Fly this flag and this pennant proudly beneath our national ensign, for all the world to see that you and your fellow workers are

giving of your best—and that best is good enough—for the preservation of freedom as a way of life in this world, and for the preservation of this nation as it was founded by our forefathers, under God, free!"

Klett Joins Export Staff Of Marmon-Herrington Co.

In keeping with the National effort to cement hemispheric solidarity and promote the good neighbor policy, manufacturers and business firms, as well as the Government, are devoting more attention to Central and South America. Accordingly, the Marmon-Herrington Co., Indianapolis, Ind., has recently added to its export staff William H. Klett who will be in direct charge of

Latin American business.

Mr. Klett, a native-born American, has had many years' experience among the Spanish-speaking people, having been brought up and educated in Mexico. His business experience includes the management of a large distributing firm in Mexico City and many years as District Manager in Central and South America as well as in the United States, for several well-known automobile manufacturers.

New B-E Dealer Appointed

The Missouri-Illinois Tractor & Equipment Co., Inc., 510 Withers Ave., St. Louis, Mo., has been appointed distributor for Bucyrus-Erie $\frac{3}{8}$ -yard to $2\frac{1}{2}$ -yard shovels, draglines, clamshell and lifting

cranes in the territory including southwestern Illinois and eastern Missouri. This organization is also a distributor of Bucyrus-Erie tractor equipment.

Cletrac Official Dies

Edward M. Bell, Jr., Vice-President and Treasurer of The Cleveland Tractor Co., Cleveland, Ohio, died on January 15, 1942, at Fort Lauderdale, Fla. Mr. Bell, who was graduated from Penn State College in 1924, was associated with the Sayre Steel Construction Co. at New York City for several years and entered the service of The Cleveland Tractor Co. in 1932. He was elected Assistant Treasurer in 1935 and Vice-President in 1939, the position he held at the time of his death.

at "HOME on the Range"

OUT on jobs hundreds of miles from anywhere, you'll find Buckeye trouble-free cable controlled Dozers stepping through their paces day after day without a whimper. They're built for the toughest jobs through with-out being babied. They're "at home" on the range" or anyplace else you put them to work—ready to move big yardages in record time. Check Buckeye features first. You'll find advantages not found in any similar tractor equipment.

BUCKEYE TRACTION DITCHER COMPANY
Findlay, Ohio

NEW BUCKEYE UNITILT DESIGN!

IT'S TWO IN ONE!

Bulldozer or Trailbuilder on a universal frame! Just change the blades. Frame also accommodates Unitilt push pads.

IT TILTS!

Bulldozer as well as Trailbuilder tilts! You can use the Bulldozer moldboard for many types of trailbuilder work!

IT ROLLS THE DIRT!

Blade curvature is such that blade digs its own way in and rolls dirt ahead for bigger payloads with the same power.

IT "HUGS" THE RADIATOR!

Blade hangs close to radiator. Keeps tractor in balance with weight on all track rollers.

—AND MANY OTHER ADVANTAGES!

Built by Buckeye

Convertible Shovels



Trenchers



Tractor Equipment



R-B Finegraders



Road Wideners



Spreaders



Aggregate Plant for 9.8-Mile Paving Job

(Continued from page 2)

The washed material was delivered to a Diamond 4 x 10-foot double-deck vibrating screen with 1 1/4-inch mesh screen on the top deck, and the bottom deck divided between 3/8 and 1/4-inch mesh screen cloth. The sand was delivered to a Telsmith sand settling tank, while the stone went to a screen set at a steep angle where it was given a final rewash with spring water delivered by a Rex pump through a 3-inch spiral welded line 1/4 mile long.

Rehandling to Storage

A Koehring 401 crane with a 1-yard Owen clamshell bucket rehandled the sand and crushed stone from the delivery-chute stockpiles for the 24-hour required storage period, and then loaded from the previous day's stockpile to a wood two-compartment loading bin for the trucks which hauled the aggregate to the batching-plant stockpiles. An extra 18-yard Pioneer steel bin was used for loading the pea gravel removed as the material passed over the lower deck of the last vibrating screen.

Personnel

The average production of this temporary plant was 100 tons an hour, and it was operated throughout the paving contract to provide all aggregate for the Central States Construction Co. of Crosby, Minn., for whom J. A. (Jack) Woodhall was Superintendent. The contract was supervised for the Minnesota Highway Department by G. M. Christilaw as Resident Engineer.

Long-Wearing Liners Feature Pump Line

Among the features of Carver self-priming centrifugal pumps are their life-time seal assembly and the Carver impeller and removable liner. This special seal assembly is said to prevent air leaking into the pump to retard the priming efficiency and also prevents water from leaking around the crankshaft. The Carver seal consists of a grease retainer and two wearing surface seal rings, each made of tungsten carbide.

One of these seal rings is stationary and the other rotates on the shaft, and they are held in contact under the tension of stainless steel springs.

The working end of every pump is the impeller. On the line of Carver pumps, the vanes are entirely supported by a reinforced web which confines all wear to only one side of the impeller, according to the manufacturer. The impeller itself is of electric-furnace chrome nickel alloy four times more wear-resistant than cast iron, it is stated. Between the side of the casing and the impeller is a removable liner, also of chrome nickel alloy, with a cast lug which protects the casing at the point of greatest wear, where the water leaves the pump.

Carver self-priming non-clogging centrifugal pumps are available in ten different models, ranging in capacity from 5,000 to 90,000 gph. Steel base, wheelbarrow, or steel-wheel mountings are available.

Copies of Bulletin No. 105, describing in greater detail and illustrating the line of Carver pumps, may be secured by in-

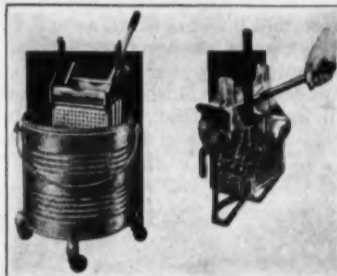
terested contractors and state and county highway engineers direct from the Carver Pump Co., Rock Island, Ill., by mentioning this item.

Air Tools for Rock Work

Bulletin CR-42 issued by Schramm Inc., West Chester, Pa., describes the complete line of Schramm pneumatic tools for construction. The catalog cov-

ers rock drills and drifters, wagon drills and drill rigs, paving breakers, sheeting driver attachments, clay and trench diggers, backfill tampers, rivet hammers and rivet busters and pneumatic equipment accessories including air hose, leaders, snap locks, valves and manifolds.

Copies of this complete catalog will be sent promptly on request to readers mentioning this item.



Complete line of Mop Wringers, Mop Buckets (Rubber casters), Mop Trucks (Twin type), Tangleproof Mop Slicks.

Amazing Service Records

Doubles Mop Life—Saves Work—Saves on Cleaning Compounds—No Splashing—Saves Floors

Illustrated here is just one of the striking GERPRES features: Overlapping staggered gears which completely eliminate side-slip and insure smooth operation.

Geerpres Units are 30% lighter, with stronger arc-welded construction. Permanently rust resistant. EXCEPTIONALLY LONG LIFE.

GERPRES WRINGER, Inc., P. O. BOX 152 MUSKOGON, MICH.

SNOW-BLOCKED ROADS CAN STOP AN ARMY!



Official Soviet Photo shows guns and armored vehicles abandoned in snow by retreating Germans Northeast of Moscow, near Klin.

Keep the Roads Open

The German disaster in Russia this past winter proves what cold weather and heavy snows can do to stop a powerful mechanized army. It holds an important lesson for America's highway officials charged with the vital job of keeping roads open for movement of war production, troops and supplies.

Above all, it emphasizes your need for WALTER SNOW FIGHTERS... the most powerful, dependable snow removal equipment available. They are specially engineered and constructed throughout for the punishing work of snow clearance. They have the exclusive Walter 4-Point Positive Drive, with automatic lock differentials that proportion the torque to each wheel according to its traction—providing maximum power-plus-traction in all wheels, at all times, under all running conditions.



Other features which contribute to the power, stamina and performance of Walter Snow Fighters are: Suspended Double Reduction Drive with high ground clearance and greater reserve strength; 10-to-1 range tractor type transmission; powerful motors that develop rated H.P. at moderate engine speeds. Write today for detailed literature.

WALTER MOTOR TRUCK COMPANY

1001-19 IRVING AVENUE

RIDGEWOOD, QUEENS, LONG ISLAND, NEW YORK

SYNTRON

For the Most Dependable

ELECTRIC HAMMERS

Magnet Hammers—Not Motor Driven. 1/2" to 2" Drilling Capacities. The Greatest Labor-Saving Tools on the Market.

ELECTRIC SAWS

2"-2 5/8"-3 3/4" Capacities. Cut Labor Costs.

CONCRETE VIBRATORS

Both External types for forms and Internal types for mass. Both electric and gas-engine driven.

ENGINE GENERATOR SETS

Make your own electricity. For operating tools and lights—right out on the job—1-1 1/2-2-3-5-6 K. V. A. Sizes.

Write for catalog information and prices

SYNTRON CO.

227 Lex. Ave. Homer City, Pa.

Care for Your Tires; Rubber Is Invaluable

A Few Simple Rules for Tire Treatment to Add One-Third to Tire Life And Save Money

By RALPH BAKER

† THERE is a story going the rounds just now about a man who was in a bad motor accident. When rescuers dashed to the scene to extricate him from the wreckage, he said, "Never mind me. How are my tires?"

The recent severe restrictions on the purchase of tires necessitated by the rubber shortage and the need for rubber in the war effort have made the general public tire-conscious to a high degree. But what many people do not know is that the life of the average tire can be increased one-third by proper care or, to put it differently, proper care gives you the service of an extra tire for every three you purchase. This means saving in dollars and saving in rubber. The first is always important, and the latter now takes on an added and vital significance.

Contractors and state and county highway departments can now, under the present regulations, secure the tires they need to carry on their work, but it is good business as well as a patriotic duty to see to it that each tire purchased provides the utmost in service. Perhaps you are getting all the service you can out of your tires, but the chances are that you and your employees are not; the chances are that your "extra" tires are still coming to you.

The service of a tire varies considerably, of course, with conditions of operation, but that does not affect the ratio of increased mileage from correct treatment. Three chief factors are responsible for most of the trouble: improper inflation, speed, and overloading, and the chief factor in all of these is friction heat.

Effect of Heat

At 160 degrees of heat a tire wears five times faster than at 40 and when rubber temperature reaches 250, it enters a clearly defined zone of trouble. For this reason tires wear out nearly twice as fast in summer as in winter.

Speed creates heat. Normal service decreases above 40 mph, and the faster you go, the greater the reduction. You can not, therefore, expect good tire mileage at high speeds, any more than you can expect good gas mileage under those circumstances.

Proper Inflation

Under-inflation is the most frequent offense against good care. Its effects are serious, for it causes ply separation, sidewall breakdown, and heat generation.

If the recommended pressure of your tires is 35 pounds, and you run at 21, a degree of under-inflation which is quite common, you cut down the normal life to 59 per cent, or almost half, and the lower they get, the poorer the service. Find out the correct pressure for your tires, and have a regular time to check them. Do this once a week at least, and once a day if you can manage it.

Recommended pressures are made to fit average conditions, but the most efficient pressure may vary with load, temperature, and kind of highway. The poundage which gives you the least tire heat is the most efficient. Truck fleet operators determine it by means of a special temperature gage used under actual running conditions. While that practice may not always be feasible, it is

GENERAL

1. Never forget that proper care pays big dividends.
2. Under-inflation, overload, excessive speed, and sudden stops and starts are enemies of tire life.
3. Check uneven tread wear at once. It may be due to brakes, springs, axles, or other mechanical conditions.
4. Examine your tires regularly and often for cuts, bruises, nails, etc., and have necessary repairs made at once. The A.A.A. alone fixed 8,500,000 flats last year, most of which could have been prevented by proper care.

TIRES

1. Maintain recommended pressures at all times.
2. Do not decrease pressure during hot weather. Ordinary temperature rises affect tire pressure very little.
3. Investigate sudden drops in pressure. First

- test cores, then look for nails and cuts.
4. Inflate tires slowly for the first 15 pounds. Stop several times to allow tube to adjust itself.
5. Change the wheel position of tires periodically. Do not allow your spare to dry out on the rack.
6. Reverse tires showing irregular wear and check for cause.
7. Do not use a loose boot in a good casing except in an emergency, and then only to the nearest service station.

TUBES

1. Use a new tube in a new tire.
2. Eliminate buckling or stretching with the proper size tube.
3. Never try to make a leaky core do a job; replace it.
4. Do not install a tube in a wet casing.
5. Clean out pebbles or loose dirt from casing before inserting tube.
6. Use valve caps at all times.

EFFECT OF OVERLOADING AND UNDER-INFLATION

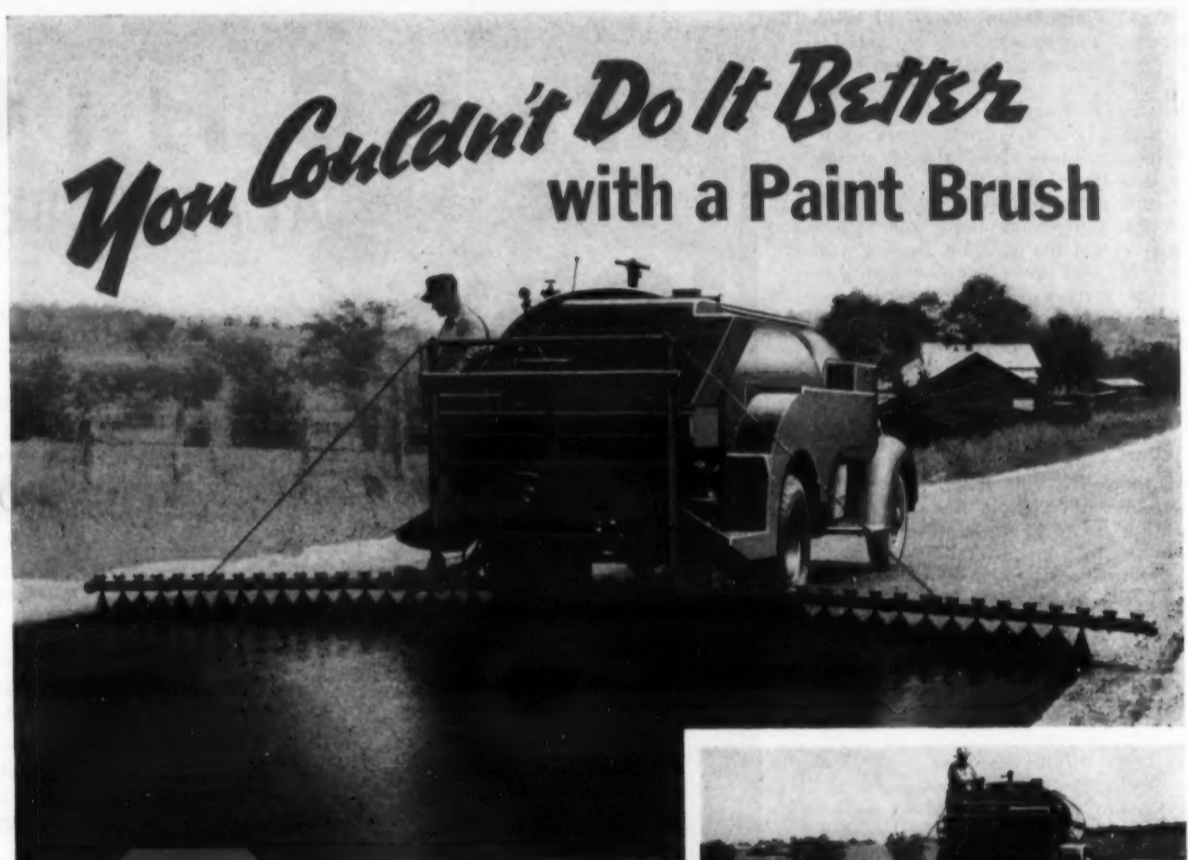
	Normal Load	20% Overload	40% Overload	60% Overload	80% Overload	100% Overload
OVERLOAD						
INFLATION	100% Inflation	80% Inf.	71% Inf.	64% Inf.	56% Inf.	45% Inf.
SERVICE	100% Mileage	70% Mi.	50% Mi.	39% Mi.	31% Mi.	25% Mi.

a good idea to feel your tires during a run. If they are heating up, try an increased pressure.

Under-inflation caused by leaky

valves is a frequent source of serious trouble. Valve caps to keep dust from getting inside the stems will prevent

(Continued on page 34)



It STARTS on a Straight Line

It STOPS on a Straight Line

An individual valve located at each spray tip operated by AIR is instantly opened and closed by the simple flip of the air valve. Pump is in circulation at all times assuring hot oil right at the tip. Less than 1.5% variation in spray by volume across a complete 24' spray bar.

Pump is large 4" Positive displacement powered by either Ford or Le Roi engines. Engine available for front or rear mounting.

Write today for name of nearest dealer.

• And Each Tip Is
Individually Tested
For Distribution



Standard Steel Works
NORTH KANSAS CITY, MO., U.S.A.

"FLEX-PLANE"

Finishing Machines

and

Joint Installing
Machines

FLEXIBLE ROAD JOINT
MACHINE CO.

Warren, Ohio

Effect of War Effort On Highway Outlook

(Continued from page 7)

create corresponding limitation of the funds raised through gasoline taxes.

"Also, if tires can not be obtained for the cars many cars will be laid up, and the owners will probably not spend the money for licenses.

"Under these circumstances, I feel sure that the funds available for road maintenance and construction will be reduced by at least 10 per cent, and probably as high as 50 per cent."

The prospects for extra Federal appropriations for highways are nebulous because the present administration never has been highway-minded, and further, the funds needed for primary war purposes necessarily reduce those available for secondary war needs such as highways, important as they are. Lucius D. Barrows, Chief Engineer, Maine State Highway Commission, states, "I think there has been to some extent a popular opinion that large appropriations, Federal and State, would be made to accomplish the reconstruction of the thousands of miles of our strategic network up to adequate military standards. It strikes me that the element of time and the immense sums of money needed to carry out such a program simply put such a course out of the question. Such a program, as far as it can be prosecuted, may well be considered for public works, which no doubt in the future will be greatly needed. I think our immediate efforts must be concentrated on taking care of the outstanding inadequacies in our highway system."

E. L. Roettiger, State Highway Engineer, Wisconsin Highway Commission, feels that, "All things would indicate a substantial increase in the cost of the (highway) work, upsetting estimates and financial plans made for work. Such a condition will no doubt warrant increasingly intensive maintenance and deferment of primary construction."

Effect on Secondary Roads

Only a small proportion of highway money expended by counties on their highway systems is produced by property taxes within the county. By far the greatest proportion of county highway money is the result of an apportionment of state gas-tax collections and various vehicle-license payments returned to the counties in varying ratios. In those states where a definite sum from the gas-tax money is required to be returned to the counties, the latter will not suffer, but where the returns are

based on a proportion of the gas tax collected, county financing will suffer in the same ratio as state highway construction and maintenance. This will result in the need for some local taxes for road maintenance.

In New England townships, roads are generally under the supervision of state highway departments with the townships or counties, or both, contributing to the cost of the work. In discussing this problem in New Hampshire, Frederic E. Everett, Commissioner of the State Highway Department, reports, "In regard to the construction of our secondary system, or what we call our State Aid Program, we are very much in doubt because of the fact that it looks now as though our income from motor vehicle fees and gasoline road toll would be greatly curtailed. This latter program hinges upon cooperation by the towns, and it is their sentiment throughout this state that they do not want to raise money for new construction. Such being the case, this program will be cut down but not wholly curtailed."

In Connecticut the construction program is divided sharply into two categories: 1, the improvement of state highways and bridges; 2, the improvement of local or land service roads. In discussing these, William J. Cox, State Highway Commissioner, stated, "The

latter type of construction requires very little in the way of materials of which there are critical shortages at present. These roads are essentially gravel roads that require a minimum of steel and other metals."

(Continued on next page)

SCHINCK TRACTOR LOADER

A mechanical loader to be used on most row-crop type tractors.

—Used for loading—

Sand, gravel, dirt, snow

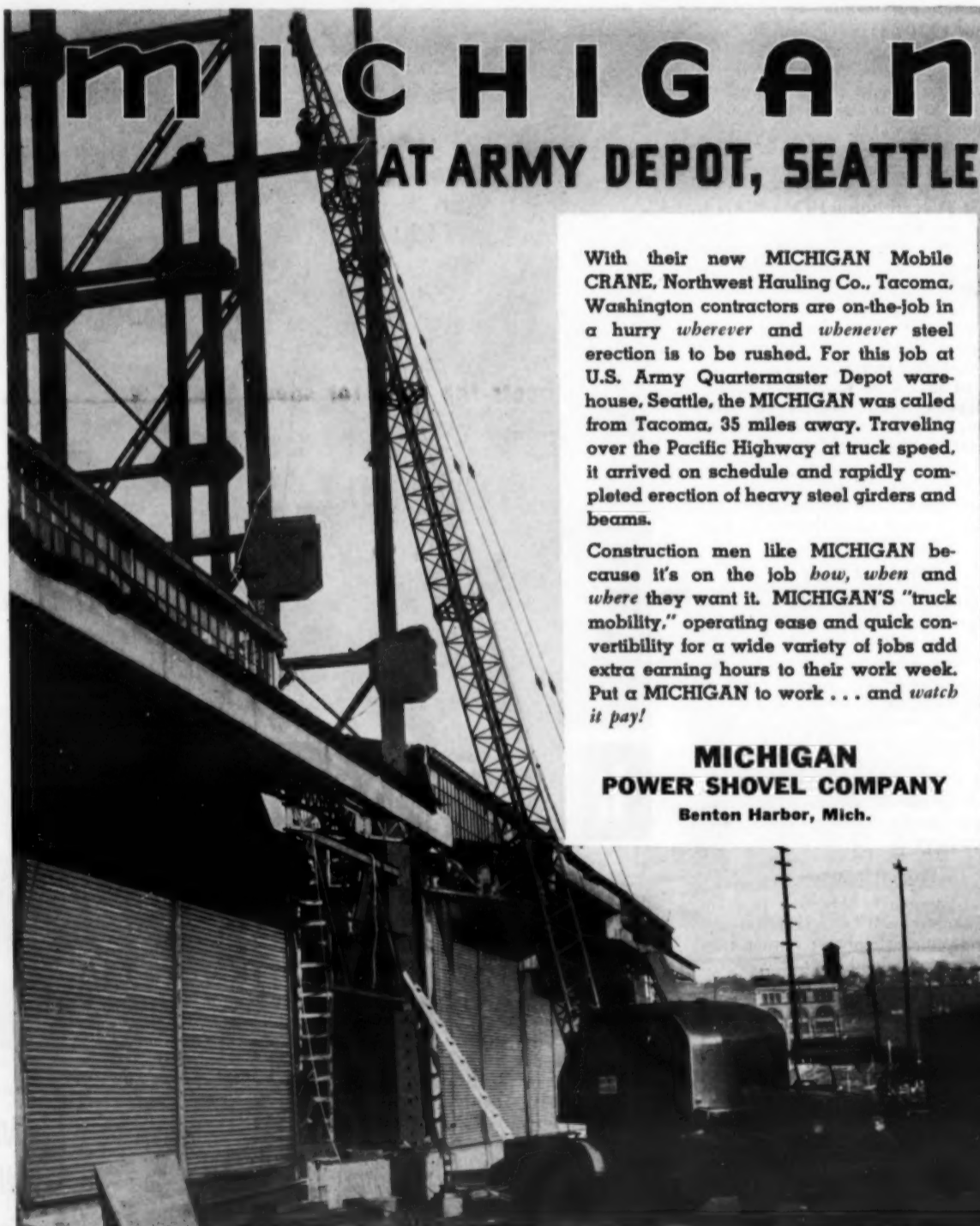
Immediate Delivery

Write for literature.

J. A. SCHINCK & SON

Manufacturers

MEADOW GROVE, NEBRASKA



MICHIGAN

AT ARMY DEPOT, SEATTLE

With their new MICHIGAN Mobile CRANE, Northwest Hauling Co., Tacoma, Washington contractors are on-the-job in a hurry wherever and whenever steel erection is to be rushed. For this job at U.S. Army Quartermaster Depot warehouse, Seattle, the MICHIGAN was called from Tacoma, 35 miles away. Traveling over the Pacific Highway at truck speed, it arrived on schedule and rapidly completed erection of heavy steel girders and beams.

Construction men like MICHIGAN because it's on the job *how*, *when* and *where* they want it. MICHIGAN'S "truck mobility," operating ease and quick convertibility for a wide variety of jobs add extra earning hours to their work week. Put a MICHIGAN to work . . . and watch it pay!

**MICHIGAN
POWER SHOVEL COMPANY**

Benton Harbor, Mich.

UTIL-A-TOOL



"Keeps 'Em Rolling" for Uncle Sam and on Construction Jobs, too!

U. S. Army Tanks are equipped with a Util-A-Tool—the multi-purpose wheel pulling, axle and frame straightening, pipe and beam bending, pushing, and jacking device. Simplifies scores of equipment maintenance jobs. Speeds aligning of crawler links for inserting pin. Safe, rugged, easy to use. Consists of 9 pieces of equipment (only 3 shown above).

Sold by leading supply houses.

Templeton, Kenly & Co., Chicago
Better, Safer Construction Jacks Since 1899

Simplex Jacks

A better Jack for every job - many jobs for every Jack

MICHIGAN

AIR-CONTROLLED

SHOVELS - CRANES - CLAMS - DRAGLINES - TRENCH HOES

Needed Road Work Must Be Carried On

(Continued from preceding page)

More Aid Where Most Needed

Our industrial network is of equal importance with our strategic network. Over the industrial network, workers are hauled to and from crowded cities, which have made life in suburb and country necessary. Where new plants have been established with no local housing facilities, workers have to travel many miles to find suitable housing, thus raising even secondary and tertiary roads to arteries of major importance.

But it is not only those states in our highly industrial areas which need reconstruction of their major highways because of increased traffic. John S. Evans, Chairman, State Road Commission of Utah, brings this out effectively in his statement. "Next in importance (after the construction of adequate access roads to the five military reservations in the state) is the strategic network. On U.S. 91, U.S. 40 and U.S. 30-S leading westerly to the coast from the Salt Lake-Ogden area, there are no major structures that have not sufficient clearance and bearing capacity. However, the major portion of these roads is inadequate as to surface stability and surface and shoulder width. Further, increased traffic on these roads would seriously endanger the existing roadway surface, and a serious hazard would result due to inadequate width. Also, between Provo and Brigham City, a distance of 102 miles, on which there now exists 58 miles of two-lane pavement, the traffic has increased to such a point that the congestion is serious; and the road should be widened to provide four lanes of traffic. Any funds which can be obtained for construction should be expended upon the above-mentioned roads, if such construction is done to best serve defense purposes; and Utah will undoubtedly act accordingly."

R. C. Keeling, State Highway Engineer of Kansas, adds to this point, after affirming his agreement that highways on the strategic network and also access roads should be strengthened. "There are also critical portions of our highway system which are not on the strategic network or access system but which are very important for the transportation of civilian supplies during the emergency. This includes structures which have been destroyed by flood within the last year and have not yet been replaced, and in the future, during the emergency, there will no doubt be additional losses due to floods and accidents caused to our structures by traffic."

The importance of improving bridges not capable of withstanding the added strain of military traffic is brought out by Frederic E. Everett, Commissioner, New Hampshire Highway Department. "We had outlined a program to take up our Federal Aid, confining it to the strategic network, and we are submitting these projects to the Public Roads Administration. Some of these projects, I believe, will not be approved as they might be considered as not essential, while they are weak links in the stra-

tegic system. There are others, like a number of weak bridges that are bottlenecks on this strategic system, that I think will be approved. We are prepared to go ahead with as much of this program as is approved by the Federal Government."

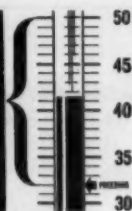
M. J. Hoffmann, Commissioner of Highways of Minnesota, brings up the very important question of salvaging stage construction by not allowing it to deteriorate through failure to complete the work. "In compliance with the clearly defined wartime policy, I feel that we must immediately revise our highway construction programs, generally eliminating all projects other than access-road improvements and vital corrections upon the strategic network. The only exception to this rule, in my opinion, should be the further improvement of those sections of highway which are now in a critical status under stage construction. It would obviously be poor economy to permit new grades and intermediate types of bases to suffer

(Continued on page 36)

AT THIS RANGE OF TEMPERATURES

Government Concrete Specifications Say:

"USE CALCIUM CHLORIDE"



Many Government concrete specifications call for the addition of calcium chloride to the mix "whenever the temperature may be expected to reach 50° F. or lower during the 24 hour period following the placing of the concrete." Temperatures within this range seriously retard both the set and development of strength even though there is no danger of freezing!

The Use of Solvay Calcium Chloride Produces:

1. **QUICKER SET:** Actual time of initial and final set is reduced 1/2 when calcium chloride is used (Nat'l. Bur. of Stds. test).

2. **HIGH EARLY STRENGTH** is increased remarkably. For example, calcium chloride increases 1-day strength of 40° F. concrete by 300% as compared to same concrete without calcium chloride... increases 3-day strength 117%, 7-day strength 76%.

3. **GREATER FINAL STRENGTH:** Nat'l. Bur. of Stds. and P.C.A. tests show calcium chloride increases ultimate strength by from 7 to 12%.

4. **EXTRA PROTECTION:** Solvay Calcium Chloride in the mix provides extra protection against frozen concrete.

5. **DEPENDABLE CURING:** Provides uniform curing for all concrete, including paving, structural and products.

6. **DENSER CONCRETE:** Calcium chloride permits reduction in water-cement ratio... means fewer water voids, denser, more moisture-resistant concrete.

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Gentlemen: Kindly send me a free copy of your booklet "Calcium Chloride and Portland Cement."

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FOR "HAPPY LANDINGS"

STANDARD OIL ASPHALT

meets the need for speed

★ Asphalt construction requires the minimum amount of time from the start of a paving job to the final load carrying finish.

The pressing need for improved, safe, all-weather surfaces on airport runways, access roads to camp and defense plants, and army camp streets, makes this time-saving advantage of Asphalt doubly important right now.

For your regular highway improvement plans, Asphalt offers these other advantages:

- Asphalt roadways can frequently be built with any local aggregate available. A big saving in transportation time and expense.
- Asphalt construction requires only equipment that is readily available.
- Asphalt surfaces may be built up to a wide variety of specifications, each designed for the traffic load and other local conditions to be met.

Wherever Standard Oil Asphalt products are sold, there is a Standard Asphalt Representative who can give you full information about its application to your problem. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago, Illinois, for the representative nearest you.

AIRPORT RUNWAYS

ACCESS ROADS TO ARMY CAMPS

HIGHWAY WIDENING

Asphalt for
every purpose

STANDARD OIL COMPANY
(INDIANA)

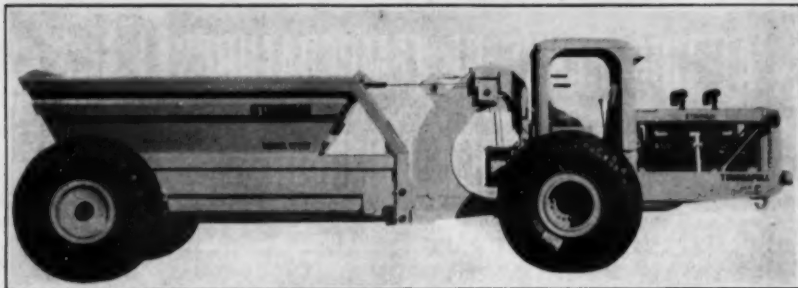
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Standard in Concrete Construction for 26 Years
ECONOMICAL and EFFICIENT

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Plate Dowel Expansion Joint
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THE PHILIP CAREY MFG. CO.
Dependable Products Since 1873
LOCKLAND, CINCINNATI, OHIO



The new W210 Tournatrailer for use with the Super C Tournapull.

A New Hauling Unit For Big Tournapull

In order to utilize fully the power and speed of the Super C Tournapull, R. G. LeTourneau, Inc., Peoria, Ill., has announced the W210 Tournatrailer with a heaped capacity of 17 cubic yards. This unit has been designed with flared side and end walls to give the bowl an 8 x 12-foot 8-inch opening at the top for quick accurate loading by big dragline or shovel.

The W210 Tournatrailer is powered by the 150-hp Super C Tournapull for fast pick-up and travel, quick spotting and maneuvering. Four forward speeds of 2.6, 4.4, 8.1 and 14.3 mph and a reverse of 2.2 mph provide travel speeds for all job conditions, the manufacturer states. The Tournatrailer rides on two 21.00 & 24 20-ply tires, the same size and ply as are used on the Super C Tournapull.

Other features of the W210 Tournatrailer are the patented self-cleaning sliding bowl which provides for end dumping or spreading in layers from 1 to 36½ inches in depth; the 21-inch external hydraulic brakes, lined with 300 square inches of woven braking surface for positive stopping; special analysis steel and box-beam construction for strength with light weight; cable operation from a LeTourneau double-drum power control unit; and interchangeability on the same power unit and Super C Tournapull with the 15-yard LP Carryall.

Further information on the new W210 Tournatrailer may be secured by those interested direct from the manufacturer by mentioning this item, or from this magazine.

Non-Metallic Bearings

A new catalog, Form No. HB-520, recently issued by the Gatke Corp., 224 N. LaSalle St., Chicago, Ill., describes Gatke moulded fabric bearings of vari-

ous types for grease or oil lubrication, water lubrication, acid-resisting service, and some unlubricated applications. These bearings are made of tough special fabrics and hot moulded under tremendous pressure.

Operating characteristics of the various types of bearings with performance results on typical applications are presented in this catalog, copies of which may be obtained direct from the manufacturer by mentioning this item.

"Victory Maintenance" Prolongs Truck Life

Scientific maintenance for dependable performance and longer truck and tire life is receiving greater consideration today than ever before by operators, both large and small. In line with this attitude, General Motors Truck and Coach Division, Pontiac, Mich., has instituted "Victory Maintenance", a nation-wide program of periodical truck inspection, servicing and general rehabilitation.

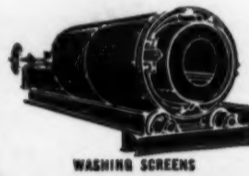
First in this program is GMC's preventive maintenance plan originated in 1928 and which is being used by many of the larger truck and coach fleets throughout the country to keep the equipment on the job with a minimum of time out for service. Preventive maintenance reveals in advance the need for repairs or replacement of parts, thus reducing the possibility of breakdowns on the job or costly loss of time on the road.

The second feature of Victory Maintenance is a series of group overhaul

operations designed to put new life into a truck. This is of particular importance to light-duty truck operators who are faced with the possibility of having to operate their trucks over a long period. Provision is made for the complete replacement of entire groups of engine and chassis parts which experience has shown should be replaced at periodic intervals for lowest maintenance cost and freedom from more costly repairs at a later date.

The third element of this program comprises complete engine or partial engine assemblies for replacement. Operators have found, in many instances, that an exchange or replacement engine is far more economical than the continued repair and servicing of a motor that has outlived its economical usefulness.

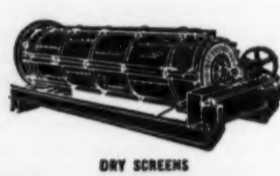
A special program for financing various service operations is included in the GMC Victory Maintenance plan through its Yellow Manufacturing Acceptance Corp. Complete information may be secured direct from GMC through its dealers by referring to this item.



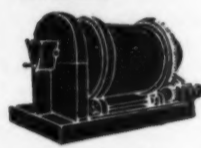
WASHING SCREENS



PULSATORS



DRY SCREENS



SUPER SCRUBBERS



SCREW REWASHERS



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SAND TANKS



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JAW CRUSHERS



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BELT AND BUCKET ELEVATORS



GRIZZLIES



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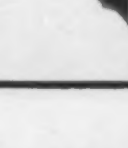
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latest in **EQUIPMENT**
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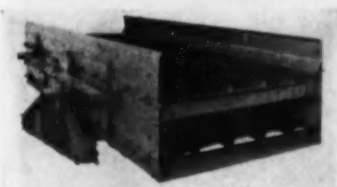
You have to look ahead these days! Line up your equipment now... be all set to push your production to new peaks and bigger profits. This new 36-page illustrated equipment guide will help you... whether you're expanding or modernizing your present plant, or building a brand new one. It gives you the latest developments in rock, ore and gravel handling machinery. Shows you exactly how to pick the right type, model or size that will best fit your production needs. Ask for new TelSmith Equipment Guide.

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"X-RAY" CATALOG on GYREX SCREENS



Send for Your **FREE** Copy Today!

The first few pages of ROBINS new X-Ray Bulletin No. 115 are printed on separate transparent sheets and show the various important parts of the well-known ROBINS-GYREX Vibrating Screen. Together these pages make up a complete screen; but taken separately they permit the reader to study each element of construction and design independently of the rest.

ROBINS CONVEYING BELT COMPANY
PASSAIC, NEW JERSEY

Please send me a copy of X-Ray Bulletin No. 115 ROBINS-GYREX Vibrating Screens.

Name _____

Address _____



C. & E. M. Photo
A protected outfall of riprap to prevent erosion in soft material by the discharge from a 36-inch culvert pipe on the Lake Traverse-Mois de Sioux project.

Dike and Road Fills On Lake Traverse Job

(Continued from page 9)

used in the compaction of the dike were made by American Steel Works, Kansas City, Mo.

Some Problems

On the highway fill on S. D. 10 the elevation of the toe for about 600 feet and for a width of about 80 feet was only 0.2 foot above lake level and was exceedingly soft. Even a light crawler tractor could not navigate on the material, so in order to handle the new road fill a bulldozer was used to make a bench on the old road fill and then the scrapers dumped their loads on the bench and it was bulldozed out onto the soft area.

In order to handle the drainage from the west side of S. D. 10, coming down a rather long slope, a 36-inch culvert pipe 138 feet long was installed. Inasmuch as this culvert pipe discharged onto a rather low fill over the soft section mentioned above, it was necessary to riprap from the discharge end of the culvert to the toe of the roadway fill.

Personnel

Work on the two roadway fills and the dike at the south end of Lake Traverse was started May 26, 1941, with the completion date Oct. 18, 1941. The contract was awarded to O. E. Miller of Milbank, S. D., on the bid of \$29,144. The work was done under the direction of the U. S. Engineer Department, St. Paul, Minn., District Office, Major J. W. Moreland, District Engineer, with O. B. Emswiler as Resident Engineer, and H. R. Abernathy as Assistant Resident Engineer. The contractor was in personal charge of the work throughout.

Handy Paint Service Chart

The question of the type of paint to use for a specific service is frequently faced by contractors and state and county highway departments. To make this problem easier of solution American-Marietta Co., 43 E. Ohio St., Chicago, Ill., has developed the Valdura Paint Selector containing all the information in chart form on the properties of and all application data necessary to choose properly from 43 paint, enamel

and varnish products. This paint selector folds to letterhead size making it convenient to keep on a desk top for reference, or to file for future use.

Two charts are embodied in the selector. Fifty-one divisions on the first chart list all types of surfaces that might be encountered in all kinds of painting,

with one or more paints suitable for the application. The second chart gives all the properties of each paint to facilitate the selection of the finish.

Copies of this selector may be secured by readers of CONTRACTORS AND ENGINEERS MONTHLY by writing direct to the manufacturer and mentioning this item.

Portable Light and Power

Bulletin No. 505-A, recently issued by Novo Engine Co., Lansing, Mich., describes the complete line of Novo generator sets to furnish economical electric light for night work and power for the use of electric tools by day. The 1, 1½ and 2-kw, d.c. units and the 2-kva, a.c. sets have air-cooled engines, while radiator-cooled engines are used on larger sizes. The generators are built by a leading manufacturer of generators and motors and are equipped with large anti-friction bearings.

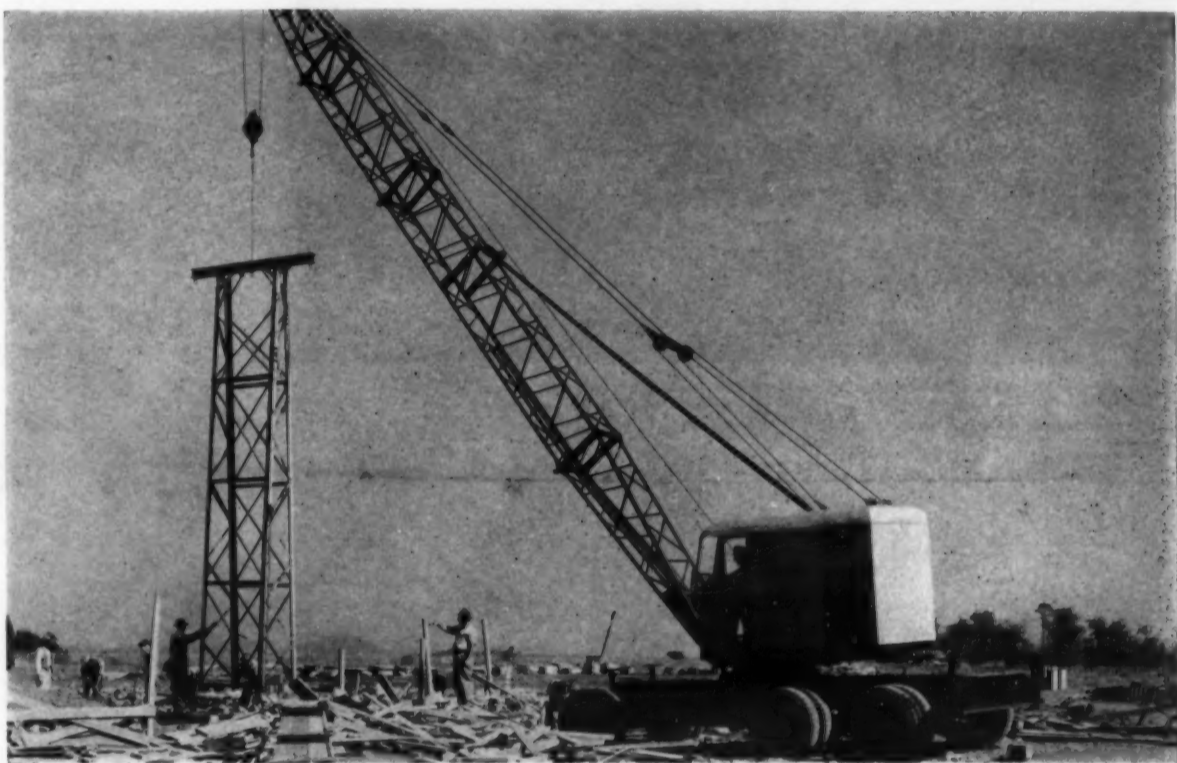
Details and mountings are shown in the bulletin which will be sent promptly on request to those mentioning this item.



Remote Control, especially valuable on construction jobs, eliminates usual delays and actually speeds up work. Preserves weld quality, too. With Hobart Gasoline Drive Portable Arc Welders you can weld continuously without fear of overheating or blowouts. Easy to control, operates efficiently anywhere. Banishes costly delays by repairing equipment right on the job. Write for details.

Hobart Bros. Box C312 Troy, Ohio

"One of the World's Largest Builders of Arc Welders"



GENERAL

SUPERCranes are selling faster than we can build them. Still, now is a good time to find out how you can save with a SUPERCrane.

GENERAL SUPERCrane!

Why Super? Because it's better!—Because it requires but one operator, and has but one engine—yet is mounted on rubber tires, steers hydraulically, moves without tracks or overhead connections—goes most anywhere. The SUPERCrane will handle more material faster, easier, and for less cost. Available as Crane, Clamshell, Dragline and Pile Driver.

General Gives You More!

SAND'S-STEVEN'S Line & Surface LEVEL



Endorsed and Adopted by Road Builders and Contractors

Level is easily and quickly attached to line. Special feature construction prevents accidental detachment from line. Construction is sturdy, and accuracy guaranteed.

SAND'S LEVEL & TOOL CO.
8531 Gratiot Ave. Detroit, Mich.

The OSGOOD COMPANY

Sizes: 1 to 2 1/2 Cu. Yd.
Diesel - Oil - Gas - Electric

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HERCULES
IRON ROLLERS
6 to 12 Tons
Diesel or Gasoline

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GENERAL

Sizes:
3/8-1/2-3/4 Cu. Yd.
Diesel - Gas - Electric



SHOVELS
DRAGLINES - CRANES
Crawler & Wheel Mounted

THE GENERAL EXCAVATOR COMPANY, Marion, Ohio



TOO STEEP. A typical shoulder and ditch section before improvement. The steep shoulder, particularly where overgrown with weeds, presented a serious hazard to cars forced off the traveled way.



OUTFALL. A long outfall ditch with a wide bottom and well-cleared side slopes excavated on a very flat grade to carry water from the highway drainage ditches to the nearest stream.



NO FLOW. Ditches clogged with weeds seriously impeded the flow of surface water before clearing, giving rise to stagnant-water conditions which encourages malarial mosquitoes and presents a hazard to motorists.



SODDED. A section along a wide sweeping curve where the slopes were flattened and sodded, and selective clearing removed undesirable shrubbery and trees along this heavily-traveled state highway in Georgia.



DRAINAGE. An effective treatment of a drainage ditch parallel to the roadway but carried behind groups of trees to save cutting down attractive Georgia specimens.

Georgia Improved And e

Seven-Mile S
Project on U
Brunswick, in
Shows Careful D

GUIDES. Glynn County direction signs on St. Simons Island, Ga., are made of cypress boards supported by swamp-cedar posts and cross beams. The lettering on these signs is hand-carved.





FLAT SLOPES. An excellent example of safety on a roadside-development project. These slopes were made increasingly flatter approaching the service station shown in the background.



FISHING. Adjacent to a bridge, the roadway shoulders were widened and reinforced with crushed stone to permit the many fishermen living in this section of Georgia to park their cars safely.

a Roadside ed for Safety Beauty

the State and Federal
on U. S. 17, south of
in Glynn County, Ga.,
ful Design and Execution

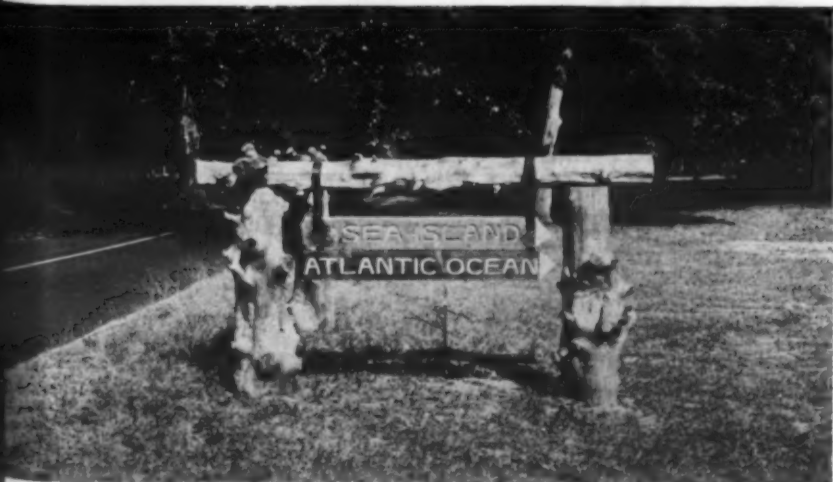


WELLS. Where the flattening of roadway backslopes cut into tree root systems, the trees were given special protection by the construction of masonry wells. Here too selective clearing adds to the motorists' pleasure in the roadsides.



CLEARING. The Hlythe Island section of this Georgia highway, paralleling the marshes of Glynn, made famous in the poetry of Sidney Lanier, shows selective clearing in a group of Georgia pines.

REFLECTING. The lettering on the lower of these Glynn County direction signs is delineated with white paint while the Sea Island sign is treated with Prismo beads which reflect brilliantly at night.



WINDOW. Freed of advertising signs, the Glynn marshes present a pleasing vista through the windows created by careful clearing and trimming of trees along this Georgia highway.



The Trans-Ceiver radio telephone for use on construction jobs and similar service.

New Radio Telephone For Construction Jobs

A completely self-contained radio telephone combination transmitter and receiver, weighing only 4 pounds and not much larger than the standard handset telephone, has been announced by the Communications Division, Weltronic Corp., East Outer Drive, Detroit, Mich. This unit is being made available to governmental agencies, such as state and county highway departments, as well as to public utilities and individual contractors working on large construction projects, subject to licensing by the Federal Communications Commission where required and to priority rating.

Compact and light in weight, this new Weltronic Trans-Ceiver has a built-in battery power supply for about 8 hours of continuous operation, or for a week to a month's operation of normal intermittent service. The power supply is derived from standard commercial batteries in order to keep battery replacement cost at a minimum and facilitate maintenance of operation. With a range of upwards of a mile over land, the units are provided with off-and-on switches and finger-operated selector to change from transmitting to receiving and vice versa, while talking through the unit.

Although Trans-Ceivers are designed for operation on a single wave length, thus requiring no tuning in service, their frequency range is adjustable from 112 to 300 megacycles through a simple externally accessible screw adjustment. Also provided on the units are a volume

control and a detachable adjustable short fishpole type of aerial.

In operation, when the toggle switch is thrown into the "on" position, the unit is receiving. To talk through the unit, it is necessary only to pull the selector finger lever down against light spring pressure. Releasing the selector lever switches the unit back to "receiving" again.

Further information on these Trans-Ceivers and their uses may be secured by those interested direct from the manufacturer by mentioning this item.

Magneto Replacement Chart

A detailed magneto replacement chart which gives complete data on the type of Eisemann magneto available for installation on all types of heavy equipment produced by major manufacturers has recently been prepared by the Eisemann Magneto Corp., 60 E. 42nd St., New York City.

Magneto replacement information for trucks, tractors, graders, conveyors and

similar equipment employing magneto ignition systems is included in the table. Data regarding the types of magneto, mounting, rotation and spark as well as coupling and drive are given for each individual engine.

Copies of these replacement charts,

which were prepared for Eisemann authorized service stations all over the country, may be secured by state and county highway departments and contractors by writing direct to Eisemann on official or business stationery and mentioning this item.

AMERICAN Safety-sized Pneumatic-tired WHEELBARROWS

You can help conserve steel and rubber for National defense by confining your wheelbarrow specifications to one of the SIX STANDARD NUMBERS in our NEW WHEELBARROW BULLETIN. One of these six numbers will fit into your job, and give you long wear that will surprise you. Your American Safety-sized tires will last twice as long as ordinary pneumatic tires; and, as you know, pneumatic-tired barrows outlast ordinary steel-tired barrows many times!

WRITE FOR BULLETIN

THE AMERICAN STEEL SCRAPER CO., SIDNEY, OHIO



Instantaneous Dumping

IMPORTANT—Simplicity . . . no mechanical body hoisting machinery . . . dumping by gravity, instantaneously . . . saves seconds with every load . . . body is dumped by releasing body latch with lever.



Making The Dirt Fly... Uphill

This action "shot" speaks! It tells the story, better than words, that the Koehring Dumptor dumps the load instantaneously, and uphill! Seconds are saved with every load! Every load is dumped instantaneously and completely, exactly where wanted. Being without mechanical operating parts for hoisting and dumping, the Koehring Dumptor does not consume time preparing to dump. The balanced body returns to loading position by force of momentum. Instantaneous gravity dumping cuts round trip time, increases production. Check your hauling operations and see how much time you are losing on the fill!

KOEHRING COMPANY • Milwaukee, Wisconsin



HEAVY-DUTY CONSTRUCTION EQUIPMENT

RED DEVIL LIGHT and POWER PLANTS 800 to 50,000 WATTS



3,000 WATT
as **\$445⁰⁰**
illustrated on
Pneumatic Tires

Finish the job quicker and save money with electricity.

Send for catalog describing generators and our complete line of portable poles for floodlighting.

E. B. KELLEY CO., Inc.
43-47 Vernon Blvd.
Long Island City, N. Y.



Superintendent Shearer inspecting tie-down anchors in the soil-cement apron.

Soil-Cement Used For Airport Apron

(Continued from page 10)

larger machines are used in these restricted sections. With this equipment a continuous process was worked out, so that all of these operations followed in order, on a 24-hour basis most of the time, so that all of the operations were being done simultaneously on successive 12-foot strips, which finally were cured by sprinkling and then covering with Sisalkraft paper.

The average production was about 500 square yards per hour, with peak production up to 800 square yards per hour. The contractor's ambition is to show an average production of 1,000 square yards of finished soil-cement work per hour with this same equipment. Another feature of the project was the installation of 1,200 tie-down anchors spotted at 20-foot intervals in the aprons.

Personnel

The contract for the soil-cement apron paving was awarded to D. W. Winkelman Co., of Syracuse, N. Y., by the U. S. Engineer Office at Providence, R. I. Senior Superintendent Malcolm K.

Moore was Resident Engineer for the U. S. E. D., and was assisted by Soils Engineer Donald Mills. The Portland Cement Association's representative was Soils Engineer Carl J. Chappell. A. C. "Andy" Shearer was Superintendent for the contractor. Both D. W. Winkelman and Andy Shearer gave much credit for the successful development and utilization of their ideas and equipment to the fine cooperation of the U. S. E. D. and P. C. A. and the efficient key men of their construction organization, who are principally graduate and student engineers.

Practical Arc Welding

Arc welding today is this country's seventh largest industry, and one of the Allies' most important defense tools. The result of the sudden acceleration of welding activity in the armaments program has been an unprecedented demand for trained welders. As a result, many contractors have lost their welders to the war industries, and new men must be trained to handle the many welding jobs on construction and in state and county highway shops. Even experienced welders find that they must keep abreast of modern procedures and techniques at all times so that they may successfully perform the increasing variety of jobs they are called upon to perform.

To meet the needs for training in arc welding procedure, *Practical Arc Welding* has been published by the Hobart Trade School. The first part of this 516-page textbook is devoted to general welding information, covering the growth of arc welding, where it is used, available metals and alloys, joints and welds, electrodes and filler rods, strength of arc welded joints, cost of arc welding, characteristics of the welding arc, welding symbols and their use, equipment for arc welding, and development of welding personnel.

Parts II and III of the textbook are devoted to the complete series of 41 arc welding lessons as they are offered in the Hobart Trade School, while Parts IV and V contain a complete dictionary of welding terms and 20 pages of helpful tabular data for operators and designers. The handbook also has an 8-page cross reference index.

Copies of *Practical Arc Welding* may be secured by those interested direct from the Hobart Trade School, Inc., Troy, Ohio, or from this magazine. Price: \$2.00 postpaid.

New Bulletins Describe Line of Hose Couplings

Eastman couplings and hose assemblies for hydraulically operated machines or equipment such as snow plows, graders, scrapers, disks, lubricators, farm machinery, machine tools, and similar equipment, are described and illustrated in catalog No. 42-H recently issued by the Eastman Mfg. Co., Manitowoc, Wis. This catalog contains full details, from orifice through the assemblies and also the thread sizes.

The line of Eastman hose couplings for air and paint spray hose, for water and acetylene hose, for high-pressure grease hose, welding hose and similar uses is described and illustrated, with many accessories, in Catalog No. 41-A. These couplings are made in three general types; renewable couplings with inserts for hose having a rubber tube and of wrapped or braided construction; renewable couplings without inserts for hose having a metal lining or core and a rubber or braided cover; and insert

couplings for any hose having a rubber tube and where attachment is made by the use of a ferrule, clamp or wire.

Copies of either or both of these catalogs may be secured by interested contractors and state and county highway engineers direct from the manufacturer by mentioning this item.

Want any information on equipment?
Write the Editor.

FREE 80-PAGE CATALOG OF OIL-BURNING EQUIPMENT for CONTRACTORS & ENGINEERS

A valuable REFERENCE GUIDE!

Write for Catalog No. 200E today.

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Purchasing EXECUTIVES . . .

—of successful manufacturing companies—whose responsibility it is to buy wisely—usually decide on "Briggs & Stratton" when gasoline motors are needed.

These Machines Are Representative Examples of the Wide Variety of Applications of Briggs & Stratton Motors.

ROAD MARKER

BATTERY CHARGER

SICKLE BAR MOWER

Men who make buying their job pay exacting attention to quality, dependability, and value, carefully check the integrity and standing of their suppliers.

And that is why purchasing executives usually prefer to buy 4-cycle, air-cooled gasoline motors for their powered equipment from Briggs & Stratton — the world's largest producers—sizes, 2/3 to 6 HP.

BRIGGS & STRATTON CORP., Milwaukee, Wis., U.S.A.

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ROLLED STEEL CONSTRUCTION for GREATER STRENGTH and SPEED

BULLDOG GRIP

● There is tremendous closing power in Williams Buckets.

That's why they bite so deeply and cleanly in hardpan digging, or work so proficiently in clearing rubble, lifting rocks or slabs of concrete.

Williams Buckets are "built to last and move dirt fast". All-welded construction at vital points imparts greater strength while eliminating excess weight; only riveted at sections which may ultimately require replacement. Another important exclusive feature of the Williams Bucket, illustrated in action, is straight line reeving that reduces wear and prolongs cable life.

Many definite reasons why your next bucket should be a Williams are found in the individual bulletins completely describing each type of Williams Bucket.

Sent free on request.

THE WELLMAN ENGINEERING CO.
7012 Central Ave., Cleveland, Ohio
Distributors in all parts of the country

WILLIAMS Buckets
built by WELLMAN



C. & E. M. Photo
Patching the curing paper to extend its service life on the Central States Construction Co.'s 9.3-mile concrete paving job near Duluth, Minn.

Pouring and Finishing New Boulevard Highway

(Continued from page 12)

length, and tied to the transverse bars, being spaced 1 foot 3 inches apart. These steel assemblies for the contraction joint were set by a special device which held them in place during pouring, and then by pulling a lever on each side of the joint at the forms the steel was released. The concrete was placed completely around the joint assembly for both contraction joints and expansion joints and was vibrated with a Jackson 1941 model concrete vibrator to insure dense concrete at the joints. This vibrator was also used against the forms on both sides of the pavement.

The same steel assembly is used for the expansion joints with the exception that a metal insert is placed to leave an opening in the pavement rather than placing preformed expansion-joint material. This slot is later poured with $1\frac{1}{2}$ inches of asphalt filler made up with diatomaceous earth and then, when this has hardened, the joint is packed by hand to within $2\frac{1}{8}$ inches of the top with granulated cork. The top is then poured with the same asphalt mastic as is used on the bottom of the joint.

Since the paver on this job ran on the subgrade, the expansion and contraction joints as well as the longitudinal steel were made up between the paver and the concrete. This required three men on the outside assembling the steel in the setting devices and two men between the forms placing the steel.

The Finished Slab

The concrete slab is 22 feet wide, 9 inches thick at the sides, reducing to 6 inches thick 2 feet from the forms, and is then uniformly 6 inches thick across the center of the pavement. The concrete is finished with a crown of $1\frac{1}{8}$ inches in 22 feet.

The man responsible for dumping the batch trucks into the skip of the Koehring 27-E paver laid out the sledge attached to the skip each time it came down on the road. Then when it was raised and the batch dumped into the paver drum, the sledge fell over, giving a sufficient blow to loosen all material which might have adhered to the skip. The paver pushed a planer with plows

at the sides, which cleaned out the thickened-edge trench and also pulled a final subgrade planer. Three men worked around these two planers to remove excess earth. The paver hose was carried out to the front planer and then on a short boom to clear the forms. The specifications required a 60-second mix, giving a 74-second cycle for this outfit, which laid an average of 125 feet of 22-foot pavement an hour.

This outfit worked three puddlers and one vibrator man in the pit ahead of the Heltzel Flex-Plane 2-screed finisher equipped with vibrators for the front screed.

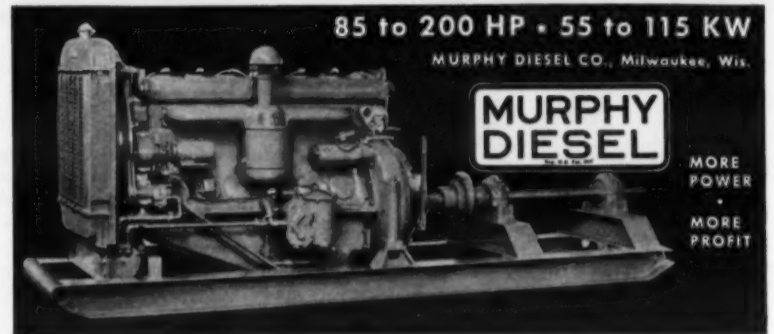
Immediately behind the Flex-Plane finisher was the machine for setting the center joint. The saw-tooth cutter with plow handles for cutting the slot at the contraction joint was carried on the front of this machine, which was moved ahead by hand cranking instead of being pulled by the finisher. The cutter wheel for the center joint was mounted on a shaft which was carried to one side to a two-flange wheel running on one of the

forms to insure accurate cutting of the slot, which is $2\frac{3}{8}$ inches deep. Two men on this machine set the 5-foot length of oiled steel bars to form the center joint and one of them cranked the machine ahead. The bars were hammered into the concrete in the slot formed by the cutter wheel and then hand-floated over the top.

A double rolling bridge running on the forms was used by two men for

handling the 10-foot wood bull-float which was adjustable by means of blocks and threaded bolts to keep it flat and straight. Then came the hand-finishing operations done by two men, first with long-handled wood floats, then a 10-foot drag straight-edge and finally pulling an 8-inch canvas belt over the surface. The next two finishers lifted the steel inserted by the men on the cut-

(Concluded on next page)



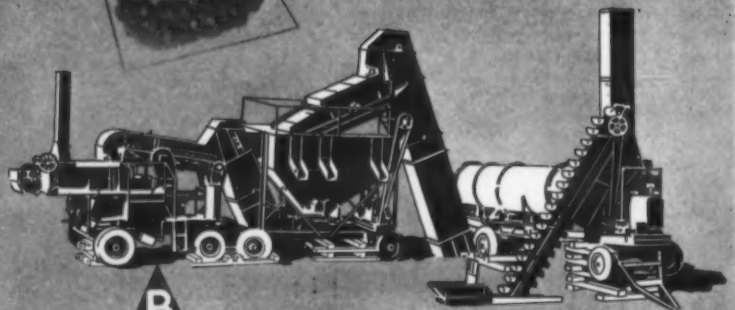
Continuous Mixing

Why did Barber-Greene build a continuous mixer instead of the conventional intermittent batch type? The answer is in the diagram of the Barber-Greene shown above. At the upper left, the graded, and accurately measured aggregate continuously enters the pugmill in a small stream. In entering, it falls through the spray chamber where it is continuously sprayed with a small stream of metered bitumen. The combining process has started, even before the materials enter the pugmill. The need for preliminary dry mixing is completely eliminated. The Barber-Greene does not have to undo the segregation caused by dumping batches into the mill. In fact a cross section of the mix extracted just a few inches beyond the charging end of the pugmill contains the correct amount of each size of aggregate with the correct ratio of bitumen.

Here the propelling and retarding paddles work the material through the pugmill under pressure, using friction to take the excess from the fines and evenly coat the coarse material.

As the mix is constantly worked through (from left to right in diagram) there can be no dead material, even at the very bottom.

The Barber-Greene uses more horse-sense, and less horse-power. It attains complete homogeneity the easiest, most logical way. It has not only established new standards for accuracy and uniformity, — but has changed moving and erection from a major project to a simple low-cost maneuver. Barber-Greene Company, Aurora, Illinois.



BARBER-GREENE



Complete Line
of
DERRICKS
and
WINCHES

SARGEN DERRICK CO.
3101 W. Grand Ave. Chicago, Ill.



C. & E. M. Photo
The Heltzel Flex-Plane finisher carrying a heavy load of dry concrete on the Central States Construction Co. contract on U. S. 53 leading into Duluth.

Boulevard Provides New Entry to Duluth

(Continued from preceding page)

ter machine for the transverse and longitudinal joints and edged the joints, using the steel as a guide. An innovation in this work along the center line was the use of a small pointing trowel wired to a long handle to cut along the steel before it was lifted. This prevented the breaking of the edge of the concrete which had begun to set up and insured better finishing. After this operation two men gave a broom finish to the pavement, edged the sides, and then went back and covered the entire pavement with paper.

Lip Curb and Curing

When the grade of the pavement exceeded the crown, a lip curb 3 inches high, 2 inches wide at the top, and feathered out on a 3-foot radius to 16 inches wide at the bottom, was built by a crew of two men, with a third hauling concrete back in a wheelbarrow. The curb was built against a steel form attached to the top of the road form, a frame was set to give the approximate dimensions during the building of the curb, and then it was hand-floated and finally given its finish by means of a steel mule pushed along the form.

The contractor used both Sisalkraft paper and Scutan paper for curing. It was used in 60-foot rolls on 4 x 4's and 24 feet wide so as to cover the pavement and the sides when the forms were stripped. Where breaks occurred in the paper due to repeated use, they were patched with tar and pieces of the same paper. The paper was required to be left on the pavement for 72 hours, which completed the curing period.

Personnel

The concrete paving on Project 6915-18, which included 9.8 miles of grading, paving and shoulder on U. S. 53, was done by Central States Construction Co. of Crosby, Minn., with whom was associated Whitmas & Borg of Duluth, Minn., on the grading. The contract was awarded to these two contractors on their joint bid of \$304,939 for grading and paving. For Central States Con-

struction Co., J. A. (Jack) Woodhall was Superintendent and G. M. Christlaw was Resident Engineer for the Minnesota State Highway Department.

P&H Personnel Changes

The Harnischfeger Corp., Milwaukee, Wis., announced recently that R. H. Sturgeon, Manager of the Small Excavator Division, is now acting head of

the Large Excavator Sales Division as well, and R. D. Holcomb has been appointed District Manager in charge of its San Francisco Office.

Arc Welding Strengthens Road-Building Machinery

To obtain the rigid construction necessary in road-building machinery, the Gledhill Road Machinery Co., Galion, Ohio, is another manufacturer using arc welding in the construction of its equipment, including fastening reinforcements to the chassis of road shapers, road adjusters, and other road-building equipment.

According to William Gledhill, Chief Mechanical Engineer of the Gledhill Company, arc welding provides a very satisfactory method of securing the required rigidity to prevent loosening of parts under the hard usage to which the road machines are subjected and saves approximately 25 per cent in production costs. General Electric arc welding equipment is used.

PILE HAMMERS and EXTRACTORS HOISTS-DERRICKS WHIRLERS

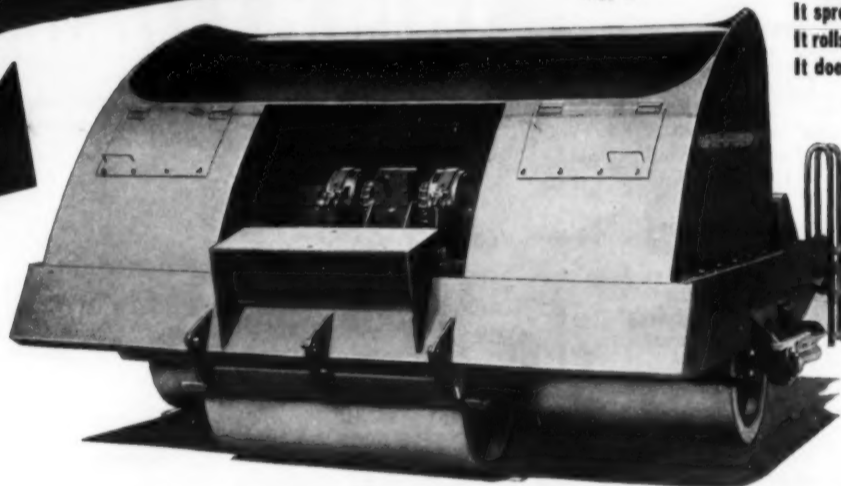
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One way to
catch up on
Aggressor Nations



The Spreaderoller
segregates chips—
It spreads 3 sizes—
It rolls firm and smooth—
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Totalitarianism has a head start on us, but we can easily catch up with help from time-saving, cost-cutting equipment like the Universal "Chip-Top" Spreaderoller.

The Spreaderoller applies a seal coat on bituminous treated mat base, segregating chips, spreading them in 3 layers—largest first, then medium and fines on top—and rolls them firm and smooth in a single operation at speeds up to a mile an hour.

The result is a tightly interlocked, water-repellent, anti-skid, "white top" surface ideal for airport runways, aprons and hangar floors, as well as for defense roads and thoroughfares.

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620 C Avenue, West • Cedar Rapids, Iowa



Days were lopped off the construction of this airport with a Spreaderoller. Top view shows coarsest material being deposited. Center view shows portable loading ramp removed.

WON'T QUIT or cause time out



A Hayward Bucket keeps the job going ahead on scheduled time. It won't quit or cause time out.

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Hayward Buckets

UNIVERSAL

CRUSHERS, PULVERIZERS, COMPLETE PLANTS, SPREADERROLLERS, PORTABLE ASPHALT PLANTS



C. & E. M. Photo
A complete Barber-Greene drier and mixing plant which produced 400 tons of hot-mix seal per 10-hour day under difficult conditions north of Hattiesburg, Miss.

Hot-Mix Prepared By State-Owned Plant

(Continued from page 1)

vide a much smoother wearing course.

The plant we inspected in late 1941 was operating north of Hattiesburg, Miss., just off U.S. 11, furnishing material for resurfacing and strengthening a 6 to 7-year-old surface treatment on that heavily-traveled road. The plant, capable of mixing 70 to 80 tons per hour, was limited to 40 to 50 tons per hour by the character of the aggregates, their slow delivery and the moisture content. The complete plant consisted of a Barber-Greene 833 portable drier, with a B-G 842 traveling mixer set up as a stationary plant and, on the road, a Jaeger bituminous paver.

Drying the Aggregates

The plant set-up was located approximately at the center of the job, requiring only a ¼-mile haul of the mixed seal. The coarse sand was hauled 5 miles to the plant, and the fine sand 2 miles. From the gravel-surfaced road which was formerly U.S. 11, a dirt ramp was built up to the L-shaped divided hopper for the coarse and the fine sand. These materials were fed by a reciprocating feeder to the cold elevator, which delivered them to the top of the 20-foot x 48-inch drier equipped with one heating torch using Bunker C fuel. It is planned to revise this set-up, so that a cheaper fuel may be used, by preheating the material. The dried aggregates were then delivered from the drier by a 21-foot 6-inch hot elevator to the plant hot bin. Inasmuch as a well-graded pit-run material was being used at this plant, no screening was required. The major control was effected at the feeder, where one-third fine sand and two-thirds coarse sand was fed to the cold elevator. A 2,200-gallon tank truck was used

for hauling the fuel, delivering it to a 3,000-gallon storage tank by the truck's own pump. The fuel pump on the Barber-Greene mixer picked up the fuel and delivered it under pressure to the torch in the drier, where atomization was aided by steam from the tank-car heater.

Continuous Mixing Plant

RC-4 Shell asphalt was delivered to a siding below the plant, usually in insulated tank cars but at times, because of difficulties in delivery, shipments were necessarily made in non-insulated cars, which always meant delays in raising the temperature of the car sufficiently to operate the plant satisfactorily. The economy of using an RC-4 asphalt instead of straight asphalt is that the cut-back can be used at 175 to 185 degrees Fahrenheit and with an aggregate of as much as 1.5 per cent moisture, while the temperature of the straight asphalt would have to be raised another 50 degrees and the aggregate be drier to operate satisfactorily. A Cleaver 2-car trailer-type tank-car heater was used to furnish steam to maintain the temperature of one already-heated or insulated car of asphalt, to heat up a second car to the proper operating temperature, and to provide steam for atomizing the fuel for the drier burner. This was placing a rather heavy demand on the tank-car heater, which was easily

capable of handling any two of the operations. This was overcome by heating the cars up to 225 degrees Fahrenheit at night, and this temperature would hold satisfactorily all day if the car was insulated and the weather hot. A 7,000-gallon asphalt storage tank was set up adjacent to the plant, so that asphalt could be unloaded from tank cars to save demurrage in case of bad weather

(Concluded on next page)

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General Motors Corporation
DETROIT, MICHIGAN



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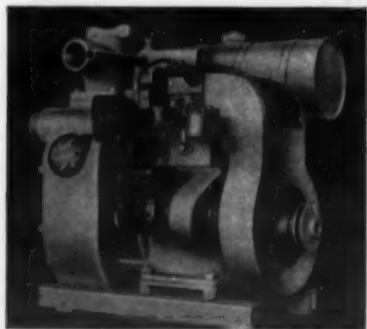
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2" High-Pressure Pump

Light weight, high-capacity, self-priming
Delivers 65 gallons per minute against 90 lbs. pressure, or 50 gallons per minute against 65 lbs. pressure. Suitable for jetting piles, supplying water to concrete mixers through long pipe lines against high pressure.

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A MOBILE NATION IS A STRONG NATION

Always SEE YOUR LOCAL CHEVROLET DEALER FOR SERVICE

on any car or truck

Heavy Seal Improves Mississippi Highways

(Continued from preceding page)

when the plant could not be operated. A 500-gallon tank, mounted on either a flat bed or a dump truck and secured by timbers and roping, was used to furnish water for the tank-car heater.

The hot aggregate ran from the bin directly to the metering feeder, which carried it at a predetermined rate to the pugmill where, on this job, it was mixed with 5.5 to 5.6 per cent by weight of the RC-4 asphalt. The hauling trucks ran through a slightly depressed roadway at the delivery end of the continuous mixer, received their loads, and then drove about 100 feet to a Howe platform scales where the weight of each load was taken and recorded. At its peak of operation on this particular set-up, the plant produced 400 tons of hot mix per 10-hour day. This was working under the limitations mentioned before, and was largely governed by the receipt of aggregate.

Spreading the Seal

Four state maintenance trucks were used to handle the hauling of the mixed seal on this particular job. The Plant Superintendent bases his number of trucks on the very simple formula of: one truck per mile of haul, one truck at the spreader, and one truck loading at the plant.

Just prior to the spreading of the new seal, one-half of the road was given a tack shot of 0.08 gallon per square yard of RC-1, using an Etnyre distributor with an 800-gallon tank mounted on a Mack truck. Only one-half the road was shot at a time, so that traffic might use the other half without picking up the tack.

The hot-mix seal was spread by a Jaeger bituminous paver, spreading an average of 170 pounds of seal per square yard, which gives an average thickness of 1 3/4 inches, with about 1 1/2 inches of material in the center of the road where the crown is high to a maximum of 2 to 3 inches at the edge, taking out irregularities. The spreader laid down a 9 1/2-foot strip first for one full day, and then came back, moving with traffic, the next day, laying a 10 1/2-foot strip. In this way, the tread of the spreader which was

outside the spreading area did not run on material already laid down and give it an initial compaction ahead of the roller. Before the second lane was laid, the joint was cut straight and vertical where traffic had knocked it down. The seal was immediately rolled with an 8-ton Buffalo-Springfield tandem roller.

Organization

The Maintenance Division organization for the operation of this plant and spreader consisted of the Plant Superintendent, who was also in charge of spreading on the road, one Construction Division Inspector on the mix and materials, one checker at the hopper of the plant, who gave tickets to the maintenance-haul contractor for the loads of sand delivered to the plant, three men working at the hopper because of the unusual cramped conditions, one root picker on the cold elevator, one man for the drier torch, one grease man on the whole plant who also refueled the gas engine, one mixer operator (the truck drivers spread the load in the bod-

ies of their own trucks), one scale man, one day fireman on the Cleaver tank-car heater, and one night fireman on the same machine who also acted as watchman, one engineer for maintenance, and one tank-truck driver who operated the Jaeger Sure-Prime pump at the creek to fill the tank truck which supplied the tank-car heater.

On the road at the spreader, one man worked at the hopper of the machine,

cleaning the truck bodies as they delivered their loads, there was one Jaeger spreader operator, two men on the wings and raking, three flagmen to control traffic on both sides of the machine and at the machine, and one roller man. H. J. Henegan is Asphalt Plant Superintendent for this outfit.

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Designed for Speed
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ALL THE SAME DRILL!



DR30 drills a flat hole 8 feet above ground level.



Set for drilling a low, flat hole.



Set for drilling a high hole, angling upward.

THE varied positions taken by the DR30 machine illustrated here are only a very small part of the settings possible with this latest Cleveland wagon drill. The DR30 has the double screw U-bar jack — the recoil device (it increases cutting speed) — the improved centralizer — the forward leg point, to steady the drill — all the important features of the older designs, with the improvements that make the Cleveland DR30 the most popular wagon drill ever built. • Ask for new Bulletin 132 — just off the press. It tells the whole story.

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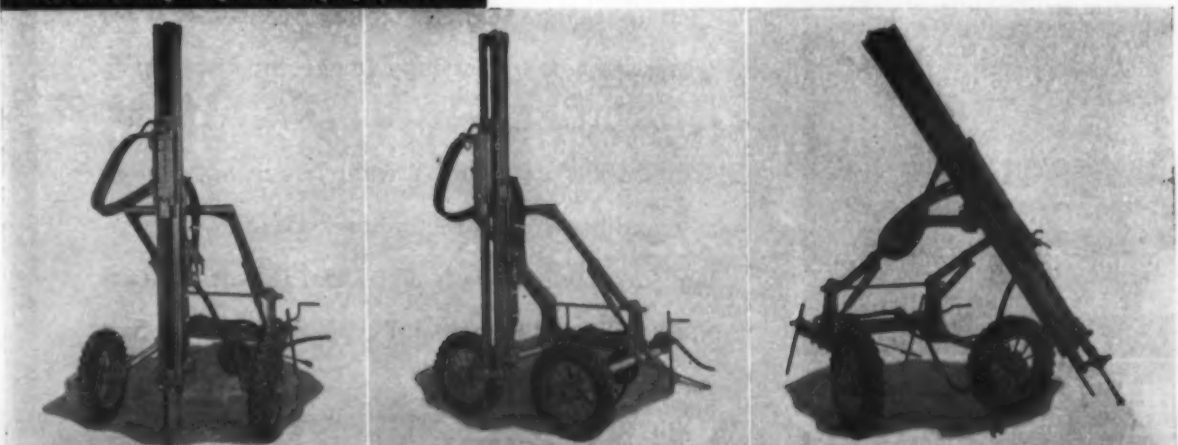
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Cleveland DR30 has a "slabback" mounted drifter, double screw U-bar.

Note how the wheels can be swivelled.

Another position of the wheels and drill.

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Keep rims free of rust by protecting them with paint.

Proper Tire Loading Increases Tire Life

(Continued from page 21)

much of it. Be careful, also, to clean off the top of the valves before applying the air hose, so that no foreign particles may be blown into the tube.

Over-inflation is less common, but it is responsible for a good many blow-outs, puts constant strain on the casing, and causes rapid wear on the center of the tire.

There is always a safety margin of several pounds upward from the recommended pressure, however, and it is better to be a little over rather than under.

Loading

Although overloading is of more concern to owners of trucks, and therefore to our readers, than to those of passenger cars, it is well to caution the latter, as there are many passenger cars carrying more than they should. Trucks are usually overloaded deliberately because the owner erroneously thinks it economical to do so. If you insist on overloading, you will have to expect less tire mileage. The table on page 21 will give you an idea of the effect of overloading and of under-inflation.

As may be seen, the greater the load, the less the service, and the reverse is also true. Considering only the factor

of weight, if you carry a 20 per cent overload (second column in the table) you decrease normal service 30 per cent.

Other Wear Factors

Wobbly wheels are responsible for the hills and valleys in your rubber that soon ruin the best tires. Wear on one side of the tread is caused by poor alignment, and when you consider that a tire $\frac{1}{2}$ inch out of line is dragged sideways 87 feet in every mile, it is easy to see why. A single worn spot is usually caused by a brake drum out of round so that uneven brakeage is applied. Replace worn bushings, keep your front wheels properly aligned, and watch the wear signs.

Step over and examine the pavement sometime after a heavy-footed driver takes off. If you look closely, you will find black rubber dust on the concrete. A tremendous amount of friction is generated in starting, which, if applied suddenly, is borne by a small section of the tread. Some drivers reduce the

(Concluded on next page)

**MORE
WORK!
LESS AIR!**

The C-86
Paving Breaker is suitable for a wide range of demolition work: cutting out pavement, cement floors, foundations, punching holes through concrete, brick or stone; for laying cables, gas mains, water pipes, street car tracks.

HARDSOCG BREAKERS

for Power, Speed
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NOTE THESE ADVANTAGES
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- Fully air-cushioned
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- Valveless
- Foreign matter passes through without interference and costly delay
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- Fully guaranteed by one of the oldest Pneumatic tool builders

The C-59
Paving Breaker is used where much of the power of a heavy-weight breaker, but the handling ease of a light-weight tool, is demanded.

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TOUGH AS A TIMBER WOLF.

tame as a puppy



Purple Strand Form-Set is the toughest, strongest wire rope in the commercial field . . . and yet it's not wild or hard to control.

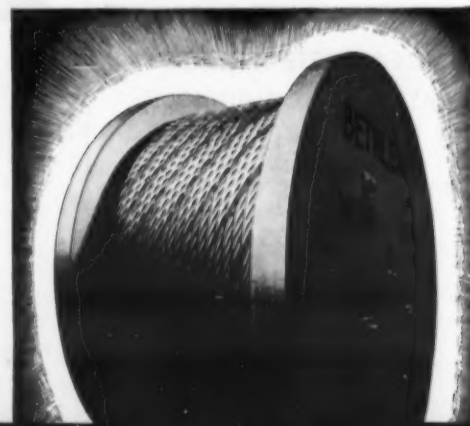
Reasons: the premium steel in this rope is pre-formed (each strand permanently set in the corkscrew pattern it will occupy in the finished rope). As a result, Form-Set rope is relaxed, easy to handle. It can be cut or spliced without seizing, spools easily, and has greater resistance to bending fatigue.

Right now wire rope is a key tool in war production. For efficiency—make it Purple Strand Form-Set.



BETHLEHEM STEEL COMPANY

PURPLE STRAND FORM-SET WIRE ROPE



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Portable Combination Hot
and Cold Mix Plants

Portable Hot Mix Plants

Stationary Combination
Hot and Cold Mix Plants

Cummer Combination
Dryer-Coolers.

Steam Jacketed Mixers 400
to 8000 pounds capacity.

Cummer Internal Fire Dryers
Electric Batch Timers

THE F.D. CUMMER & SON CO.

Euclid and 17th, Cleveland, Ohio



Worn spots like this are caused by uneven brake drums. Wear on one side is usually caused by misalignment, while a hill-and-valley effect is produced by wobbly wheels.

Take Care of Tires; They Are Valuable!

(Continued from preceding page)

service of their tires one-half and even more from this cause.

When you dash up to a stop sign and apply the brakes suddenly, you do the same thing, wearing out both tires and brakes needlessly. It is not necessary to look closely to see the rubber left on the pavement from this. It is those wide, black marks. In this day of high-speed motors, these two poor driving practices are increasingly common.

Selection of Treads

More depends on the type of tires, especially in regard to tread, than the average person suspects. The various designs are not there merely for the sake of beauty. They are the result of careful field and laboratory studies which have determined the best design for every service condition. Find out what the prevailing condition is under which your tires must serve, and then consult your dealer as to the tread best adapted to it.

If you have many stops and starts, get a tire with a thick tread, for that's where your rubber goes, in stopping and starting. On the other hand, a thick tread generates more heat in rolling than a thin one, while at the same time, rolling itself, minus the heat, causes comparatively little wear. Therefore, if you make long runs with few stops and starts, choose a thin ribbed tread. For sand, a chain block is best.

Many people still question the economy of recapping or retreading, but whether you do or not, it is more than likely that you will have to do it. A few years ago it perhaps was not practical, but today with improved methods and materials it decidedly is, regardless of necessity, provided the work is reliably done. Furnishing your own casings, however, is no surety for you. It is impossible to tell whether a casing is sound by looking at and feeling it. As far as you can tell it may be perfect, but nevertheless have ply separation. Always put the casing on a spreader

which will show up any defects it may have. Never retread any casing without first doing so, and discard it if it shows any imperfections.

There is a great deal to know about tires, and the average tire user can not be expected to have it all under his hat; nor is it necessary, for your tire dealer can and will give you the answer to almost any problem which may arise, and is always glad to have you consult him.

But everyone can and should remember this: a tire is no better than its treatment, and good treatment is the same anywhere for any tire. Accompanying this article is a handy list of the main points of good treatment—mostly small things which make all the difference between good and poor service. Don't just read them. Practice them, and you will save yourself not only dollars but a lot of grief.

All over the world, wherever there are American fighting forces, the Red Cross is on the job. Aid in its work by contributing to its War Fund now!

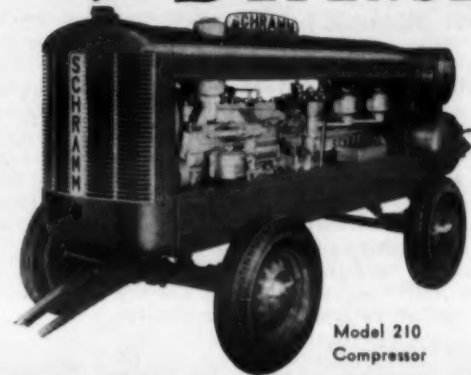


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STANDARD OIL COMPANY (INDIANA)
AUTOMOTIVE ENGINEERING SERVICE

LOWERS
MILEAGE
COSTS

Highway Maintenance Vital to War Effort

(Continued from page 23)

wasteful deterioration for lack of adequate preservative surfaces which could be applied without the use of critical materials."

That limitations of Federal Aid will not be the same in different states is an important consideration brought out by Commissioner Hoffmann, of Minnesota. "We cannot assume that Federal restrictions now in force will operate to the same degree and with the same effect in all states. Projects for the correction of strategic-network deficiencies obviously will be much more vital, for instance, in many coastal states than would be the same type of projects, correcting the same deficiencies, in those states comprising our vast interior. In other words, we must be reconciled to the fact that uniformity of treatment under existing conditions can not be expected."

E. W. Meeker, State Highway Engineer of South Dakota, also asserts the need of highway construction as follows: "It is my opinion that National Defense in its own right will require a certain amount of highway construction, which will be imperative to the best handling of distribution of preparations, materials and supplies for the armed forces. With this in mind, it goes without saying that highway construction which can show its relationship to such a necessity will be just as important as the furnishing of equipment and supplies to these armed forces."

In the southern states where climatic conditions have been more favorable for the construction of training camps, the access-road problem has been greatly increased. J. H. Dowling, State Highway Engineer of Florida, reports, "In this larger program of immediate need, access roads and roads on the strategic network appear most important. Florida has fifteen military bases which require adequate access roads. All except two are new locations requiring outright construction. These will cost approximately \$20,000,000. In addition, about 2,100 miles of roads in the state have been classed as belonging to the strategic network. Improvement of these roads to an adequate standard to serve

both military and public or civil use will require an expenditure of around \$66,000,000. The strategic network, highly significant from a military standpoint, is also the system which facilitates a major portion, about 60 per cent, of the industrial and civilian travel on the entire state-maintained system. By improving and maintaining the roads in the network, the greatest good to the greatest number can be afforded."

In view of the difficulties which some states are facing in financing highway work, the statement of J. Lyter Donaldson, Commissioner of Highways of Kentucky, is important. "I do not believe that we can consistently seek to accomplish more during our present all-out war effort than to preserve that which we have, and provide such necessary highways as may be needed for military use and the transportation necessary for industrial and civilian supplies."

"They require relatively light equipment, an adequate supply of which appears to be available in the state for such work. It appears likely also that, at least for the months immediately ahead, there will be a reasonably available labor supply. This work is carried out under statutory provisions which make specific amounts of money available each year, and will probably be relatively little affected by current conditions."

Maintenance a Prime Necessity

"Huge investments which we have made in highway improvements in the years past will be jeopardized by the lack of proper maintenance," states Charles D. Vail, State Highway Engineer of Colorado, while John F. Evans, Chairman of the Utah State Road Commission, points out that, "To serve civilian needs and army needs, traffic must be kept moving, snow removal can not be neglected, nor can we afford the loss of time incurred in any avoidable delay of manpower, or in the transport of materials. It is, therefore, very essential that maintenance be properly carried on along all main highways. Some non-essential mountain roads may be allowed to close through the winter season in order to eliminate the snow-removal costs. Some upkeep operations on minor secondary roads and bridges may be postponed; however, sufficient maintenance should be done on the roads to protect the large investment placed in such roads and bridges. Care should be taken to provide full safety facilities, including the erection of signs,

signals, markings, etc., so as to keep to a minimum the very tangible losses resulting from death, personal injury and property damage in highway accidents."

R. H. Baldock, Chief Engineer, Oregon State Highway Commission, S. E. Johnson, Director of Highways of Idaho, Wardner G. Scott, State Engi-

neer, Department of Roads and Irrigation of Nebraska, and many others have expressed their determination that the last phase of state highway work to be neglected will be maintenance.

James Logan, State Highway Engineer, New Jersey State Highway Depart-

(Continued on next page)



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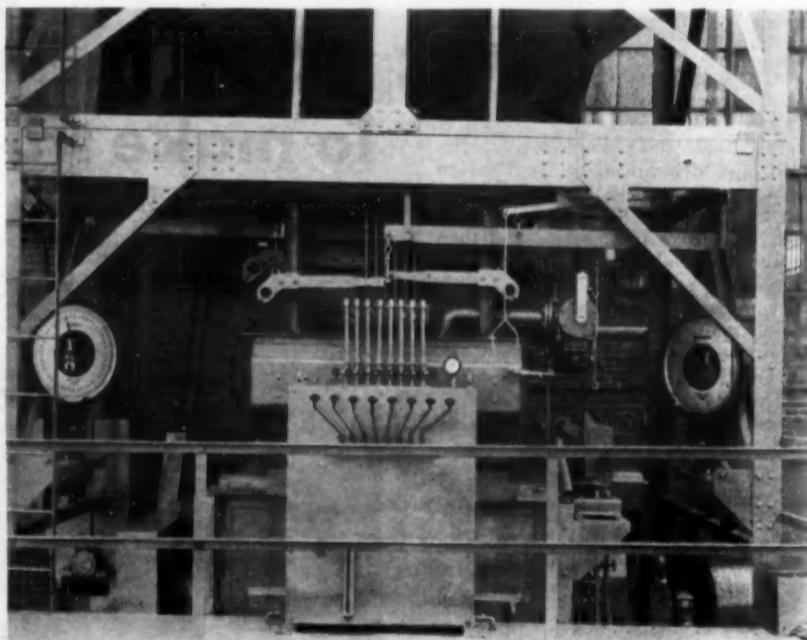
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BATCHER PLANTS

for

ACCURACY—SPEED—DEPENDABILITY

THE KRON CO.
Bridgeport, Conn.

Securing Road Funds For Work in Wartime

(Continued from preceding page)

ment, states emphatically, "Highway maintenance can be financed and must be continued at all hazards. It would never do to permit the highways to deteriorate, as they are and will be a very vital line of communication and transportation during the present all-out war effort. There never has been in New Jersey any effort to stifle the financing of highway maintenance and certainly it will never be given consideration during the present emergency. The New Jersey State Highway Department placed itself on a war basis immediately following the Pearl Harbor incident and the Department is prepared to take care of any emergency."

"In connection with the maintenance of the highways and bridges thereon," Mr. Logan points out, "arrangements have been made for the use of light portable prime movers and power tools to be operated on the site, for quickly constructing temporary bridges and trestles, materials for which are being assembled. Arrangements have been made for immediate patrolling of roads in case of any emergency and for the repair of the roads due to sabotage or enemy action."

Corrective Factors—Federal

The sole corrective factor in the highway situation which can be hoped for from the Federal Administration is an awakening to the critical value of our entire highway system which will place Federal Aid back in the financing program to insure adequate transportation facilities and protect the investment already made in our highway system.

Charles D. Vail, Colorado State Highway Engineer, appeals, "Considering all factors, we feel that it is imperative for Congress to: 1, continue Federal Aid appropriations in amounts at least equal to the appropriations made during the past several years; 2, provide additional funds for the construction and improvement of military routes and access roads serving military camps or sources of supply essential to the manufacture or production of war equipment. We can not stress too strongly our feeling that Congress will make a serious error if sufficient funds are not provided in order that the nation's highways may be improved and maintained to meet demands that will be required of them during the period of the war."

The States Can Help

Two methods of carrying on during the emergency are available to states. Bond issues may be resorted to as a means of financing necessary construction and maintenance while gas tax income is low. The returns from that tax will certainly rebound to new highs as soon as natural, or synthetic, rubber is again available for motor vehicle tires and our great automobile industry is released from its stupendous task of armament production. Secondly, states may conserve funds and essential war materials by temporary redesigning of

structures.

Ezra B. Whitman, Chairman of the State Roads Commission of Maryland, states, "One other source of funds for construction work under these circumstances would be by State Bond issue. Another possible source of income for road building might be a sales tax or some other form of tax by the State."

The State Highway Commission of North Carolina, according to W. Vance Baise, State Highway Engineer, is co-operating fully in the National Defense Program by eliminating the use of critical materials in state construction work as far as it is practical to do so. Similarly, S. E. Johnson, Director of Highways of Idaho, states, "We have, as every state has, reprogrammed and redesigned in order to avoid the use of materials necessary to our national defense."

M. R. Keefe, Chief Engineer, State Highway Commission of Indiana, reports, "In order to comply with the request of the Public Roads Adminis-

(Concluded on page 47)

**Made Good on this
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Starting here  in 1904, The Sterling Wheelbarrow Quality-Idea
Tripled to this in 1907  Tripled Again in 1910,
and Today Leads the World in this Greatest of all Wheelbarrow Plants.



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C. & E. M. Photo

What is it? It's a snow-plow caboose complete with stove and bunks for a snow-plow crew, and is towed behind plows in Division 17, north of Sudbury, Ontario.

Highway Equipment At Division Garage

(Continued from page 17)

peavies, post-hole shovels, sledges, etc. A ledge above these shelves is reached by means of a movable ladder, similar to that seen in shoe stores, giving access to a series of cupboards in which camp equipment is stored. This storage room and the five stalls for equipment are all heated from the main building and well lighted with electric lights. This section of the storage garage is new.

Immediately behind the new garage is a six-stall storage garage, 135 feet long x 24 feet wide, for the large trucks and plows, coal, calcium chloride, and for general storage. Immediately behind this is a small house for the yard watchman.

At the back is a 60 x 15-foot paint shop with a 20 x 20-foot ell with a sheet-metal roof and siding, which is used as a paint shop for signs.

Equipment Operated

Below is a list of the major equipment operated by Division 17, for which facilities are provided at the garage for repair:

- 2 Dominion Champion Model 20 power graders, with 14-foot blades and scarifiers
- 5 Dominion Champion Model 20 power graders, with 12-foot blades and scarifiers
- 1 Dominion Champion power grader, with hydraulic controls, 14-foot blade and scarifier
- 1 Austin-Western Model 99 power grader, with hydraulic controls, 14-foot blade and scarifier
- 1 FWD Model SSUA 4 to 5-ton dump truck
- 1 Studebaker 4-ton dump truck
- 1 GMC 3 to 5-ton dump truck
- 2 Chevrolet 1/2-ton light delivery trucks
- 1 Ford 1/2-ton panel truck



Demand These Features in Your MIXER!

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THE JAEGER MACHINE CO.
781 Dublin Ave., Columbus, Ohio

- 1 Allis-Chalmers Model WKO diesel tractor with Baker Model 321A Graderblade
- 1 Holman 110-cfm compressor
- 1 Willett 10-foot planer (used with FWD truck)
- 1 Northern Foundry multiple-blade maintainer
- 1 Galion leaning-wheel Model 88 grader
- 1 Waterloo 10-ton steam roller
- 1 Winchell 5-ton gas roller
- 1 Sargent V-type snow plow and wing
- 2 Frink V-type snow plows and wings
- 1 Austin-Western Giant V-type snow plow and wing

- 27 2-horse graders
- 4 4-horse graders
- 2 concrete mixers
- 5 sand spreaders
- 4 crack fillers
- 1 mower, horse-drawn
- 2 chloride spreaders
- 1 hoist
- 1 steam boiler

In the shop at the time of our visit a 500-Imperial-gallon tank was being mounted on a truck and equipped with a sprinkler bar at the back for applying solutions of calcium chloride to the roads which are regularly maintained with the chloride. Solutions of 10 to 20 per cent strength were used, and the chloride applied in this manner last year because of the extreme drought and the dryness of the air.

Snow Plowing

In Division 17, known as the Sudbury District, the heaviest snow storms occur in January and later, so that it is necessary to move the windrows from the regular plowing with V-plows back into the ditch. For this purpose, an Allis-Chalmers Model KO tractor, equipped with a Baker bulldozer, is used.

This heavy equipment saves considerable damage to the wing plows, which in many places are still operated in this work, using only one side of the plow, which throws the entire equipment out of balance and causes damaging strains on both tractor and plow. The bulldozer is also used to plow roads parallel to the highway back of snow fence, where the snow fence has become completely cov-

(Concluded on next page)

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Colorless **CONCRETE**
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"Most Valuable Piece of Equipment in Our Entire Outfit!"

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"Lubrication Delays Eliminated . . . Track Roller And Other Bearing Expense Reduced By 25%, Since We Got Our ALEMITE PORTABLE SERVICE STATION"

WRITES George O. White, well known Chattanooga contractor, "Our Alemite Portable Service Station was purchased to eliminate lubrication delays—save operating time—and give us more efficient lubrication, particularly of our Caterpillar tractors and heavy earth-moving equipment.

"The Alemite Portable Service Station has accomplished this. Not only has operating time been saved, but our maintenance expense on track roller and other bearings has been reduced by 25%. We

have also reduced our lubricant consumption by 10%, as there is little or no waste when pumping from the original container to the bearings. In our opinion, this lubricating set-up is the most valuable piece of equipment in our entire outfit!"

Complete information on the Alemite Portable Service Station—how it often pays for itself in savings before the end of a single project—is contained in a new catalog which is just off the press. Write for your FREE copy today!



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The new Heil Hi-Speed Cable Scoop.

New High-Speed Unit For Dirt-Moving Jobs

A new Hi-Speed Cable Scoop, which is said to combine the efficiency of the Twin-Cable Scoop with the speed, economy and flexibility of the rubber-tired diesel-powered Hi-Speed tractor, has just been announced by the Heil Co., Milwaukee, Wis.

Push-loaded by a crawler tractor, this new Heil unit digs a heaped 15-yard load in 40 to 50 seconds, it is reported, and moves away to the fill at travel speeds of 6 to 20 mph, depending on road and grade conditions. Its operating features are the same as the 4-wheel Twin-Cable Scoop. The Heil Hi-Speed tractor unit, Model CF600, which furnishes the power for the scoop, is a 4-wheel unit, equipped with a 150-hp Cummins diesel engine as standard, although a gasoline engine or other diesels are available if desired. The unit has hydraulic power steer and oversize brakes on the tractor drive wheel and also on the Scoop trailer wheels operated by a foot pedal. Individual hand-control brakes on the tractor drive wheels give a short turning radius. A 21-inch American Blower fluid coupling drive insures smooth operation and reduces gear shifting to a minimum, the manufacturer states. A heavy-duty rear axle is designed to withstand the shock and strain of operating on rough bumpy terrain.

The Heil Hi-Speed tractor has a 108-inch wheelbase, a ground clearance of 17 inches, and is 203 inches long overall, 92 inches high and an outside width of 103 inches. Tires on the tractor drive wheels and the Scoop are interchangeable, and a spring-cushioned push bumper is furnished as standard equipment.

Further information on this new combination unit in the Heil line may be secured direct from the manufacturer by mentioning CONTRACTORS AND ENGINEERS MONTHLY.

Howard Goes to Washington

Henry H. Howard, Manager of the Engine Sales Division, Caterpillar Tractor Co., Peoria, Ill., has been called to Washington to take up temporary wartime duties with the Ordnance Department to serve as a consultant to Colonel J. K. Christmas of the Tank and Combat Vehicle Division. Mr. Howard's position at Caterpillar will not be considered vacated but his duties and responsibilities have been assigned for the period of his absence to Horace W. Smith, Assistant Manager of the Division.



FRONT END SHOVELS

For Industrial Tractors
Write for Descriptive Circular

White Mfg. Co.
ELEXHART INDIANA

Handling Deep Snows In Ontario Province

(Continued from preceding page)

ered, or even where there is no fence and the snow has drifted high, to act as snow traps.

Last year it was found late in the season that the snow was too heavily packed to be handled effectively by the V-plows on the road so a new Austin-Western 99 grader, purchased recently by the Division and equipped with a V-plow, was used throughout the district, plowing over 225 miles of road. This equipment was supplemented, where necessary, with the bulldozer.

It frequently happens that crews have to be out more than 24 hours on a stretch, working with the bulldozer or with one of the big plows. In order to take care of these men, a cabin has been built and placed on runners so that it

can be taken out to the work. The cabin is of sheet metal, insulated, and contains two bunks, a table, chairs, and stove. A compartment at the back of the cabin is used for the storage of fuel oil for the tractor and kerosene for lanterns and cooking.

Personnel

C. F. Szammers is Division Engineer of the Sudbury District, Division 17,

with headquarters at Sudbury, Ontario, on Highway 17 which extends along the northern border of Georgian Bay from North Bay to Sault Ste. Marie. J. Costello is the Chief Mechanic in charge of repairs at the garage. He has one assistant regularly in the shop, with extra labor as required.

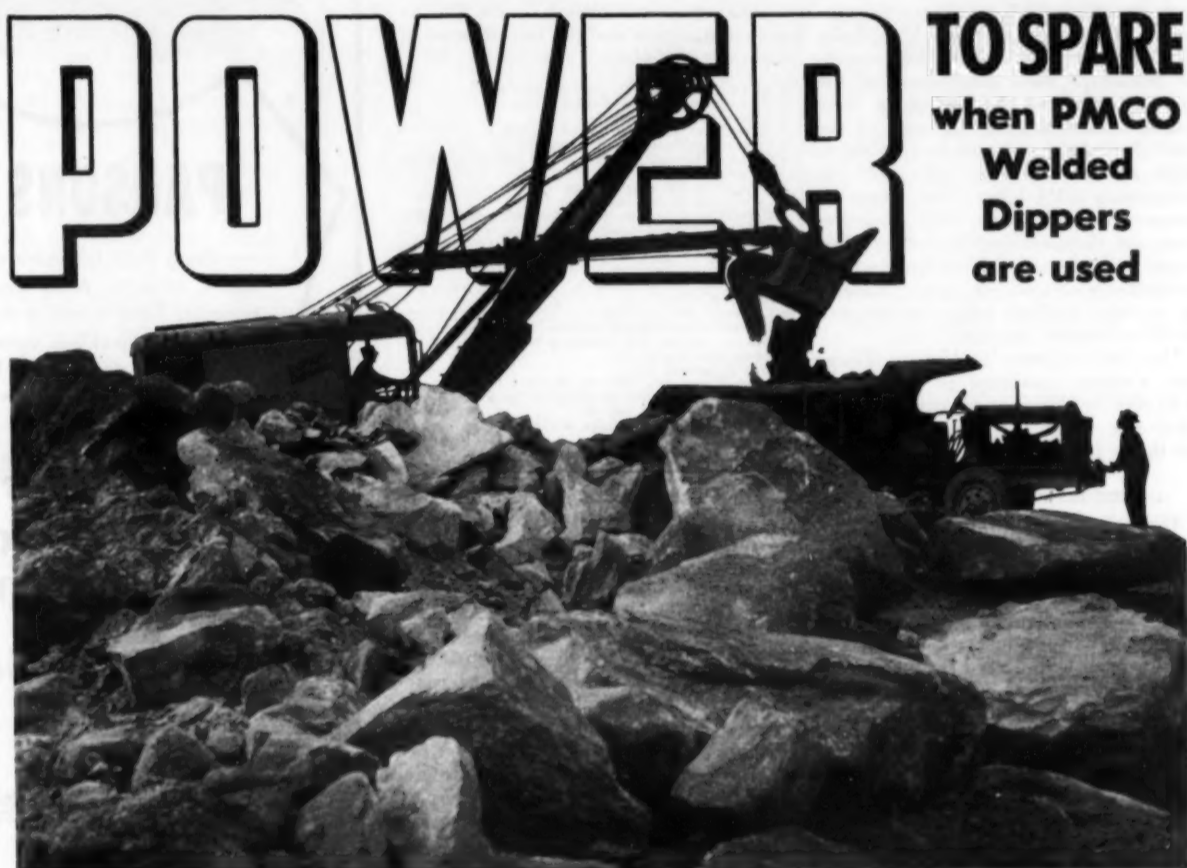
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Well-Planned Program In Minnehaha County

(Continued from page 2)

the townships, and is apportioned in January, April, July, and October. If the county highway system is not complete in any township, the state law provides that the county may take any or all of the money to be distributed to that township and apply it to highway construction on the county system within that township. Minnehaha County got for its own Highway Department a total of \$90,000 from vehicle-license fees in 1941. This County audits the warrants of the townships issued against their share of the motor-vehicle license fees, which amounts to as much as \$2,700 per year for the larger townships and in many cases is the only road money available for township roads.

The state law provides that the counties in South Dakota construct all bridges costing \$200 or more within the county. Due to the fact that Minnehaha County has at all times turned over to the townships their total share of the 30 per cent fund, the townships have agreed to contribute 50 per cent of the cost of structures in their townships. These are built to meet state specifications, using WPA labor. The actual expenses over and above WPA contributions are divided equally between the county and townships. This applies only to structures on township roads, those in the county system being constructed wholly at county expense.

The 1941 highway budget of Minnehaha County amounted to a total of \$150,000, of which approximately one-third was spent for construction and two-thirds for maintenance.

Garages and Equipment

The County Highway Garage is located at Sioux Falls, with garages for storage only at Colton, Dell Rapids, Baltic, Crooks, Ellis, and Brandon. These storage garages care only for the power patrol and truck assigned to each district, with a yard for the storage of material, such as culverts and snow fence and snow plows. The County owns 75,000 feet of snow fence.

The County Garage in Sioux Falls is a 55 x 122-foot brick structure and contains the main repair shop for all county equipment. It is located adjacent to the County Court House in the center of the city, which is not particularly convenient for the care of equipment which must be hauled for considerable distances through city streets. As one enters the garage from the front, the foreman's office with the supply room for heavy and valuable equipment, a lavatory, the parts department, which is locked behind a heavy wire screen, and the electric shop, occupy the front and left side of the garage. In the electric shop is a Tungar charger and a magneto repair outfit, a special 7-inch lathe and an attached buffer. In this room one electrician specializes in the repair of all automotive electrical equipment, and has greatly reduced the maintenance costs on this type of work. In this same room all of the electrical equipment for the automotive equipment is stored, whether new or repaired, ready for use on equipment as a replacement.

Out in the main repair shop is a garage compressor, a portable acetylene welding outfit, two overhead monorails with hoists, a 5-foot lathe, a drill press, a power hack saw, a Manley press, a

buffer, power trip hammer, forge and anvil, and plenty of bench space in spite of the relatively small size of this very compact shop.

The storage section of the main garage contains the oil room and the gas pump. There is very careful checking of the dispensing of gasoline and oil, and a perpetual inventory of these commodities as well as all parts and repair materials issued is maintained. The garage is heated from the central heating plant in the County Building. Gasoline storage is maintained in a 15,000-gallon tank located on land rented from one of the railroads, and from this tank gasoline is hauled to the county garage tank and to the various storage tanks at the patrol stations.

Adjacent to the County Garage is the Storage Garage, of the same size and built of stone and brick. In this building is located the sign shop, a good stock of blacksmith iron, bolts, and Prestone, as well as tires and grader blades. The two large Walter and Coleman trucks are stored in this garage, ready for snow removal work.

The equipment owned by the County for construction and the maintenance of its roads includes:

- 2 Allis-Chalmers Model L 75-hp tractors
- 1 Caterpillar D8 diesel tractor
- 1 Adams 412 diesel patrol
- 2 Caterpillar 112 diesel patrol graders
- 1 Caterpillar No. 12 diesel power grader
- 4 McCormick-Deering 10-20-powered patrols, which are being replaced
- 2 Caterpillar elevating graders
- 1 LeTourneau 10-yard scraper
- 1 Caterpillar 12-foot pulled grader with power control
- 1 Coleman all-wheel-drive truck
- 1 Walter all-wheel-drive truck
- 8 International, GMC and Dodge 1½-ton trucks
- 1 GMC 2½-ton truck
- 4 International 3-ton trucks
- 2 Dodge pick-up trucks
- 1 Chevrolet pick-up truck
- 2 Topeka power highway mowers
- 1 Pioneer crushing and screening plant
- 2 1-bag concrete mixers
- 1 Bros pneumatic roller
- 1 Baker V-type snow plow for Model L tractor
- 1 Wausau V-type plow for Model L tractor
- 4 V-plows for diesel patrols
- 2 V-plows for all-wheel-drive trucks

Construction Program

Minnehaha County is 816 square miles in area and has 310 miles of county highways. There are no concrete or black-top roads, all being gravel surfaced.

In 1940 the County regraded 22 miles of road, with 82-foot right-of-way, streamlining the roadway to make it self-cleaning of snow. The new roadways have 3 to 1 in-slopes, 26-foot tops, and 5 to 1 back-slopes. The 1940 program also included 22.5 miles of gravel surfacing and 71 miles of highway resurfacing.

In Minnehaha County, because heavy

winds almost invariably accompany snowfalls, the County Highway Department waits until the storm abates before sending the equipment out to plow the roads.

F. H. Schrader is County Highway Superintendent of Minnehaha County, Sioux Falls, South Dakota.

A.E.D. Proceedings Ready

A complete record of the proceedings of the 1942 Annual Convention of the Associated Equipment Distributors has been printed. Copies may be secured from George J. Boesch, 105 South Ninth St., St. Louis, Mo. Price: \$3.00 postpaid.



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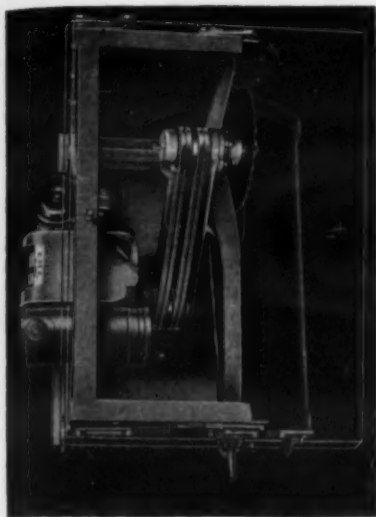
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Phantom view of the CMC Kost Kutter power saw from above.

A Streamlined Saw For Fast Form Work

To insure greater speed in form work many contractors are already using the new CMC streamlined Kost Kutter power saws made by Construction Machinery Co., Waterloo, Iowa. This sturdily built unit is made for continuous use and to handle a wide range of work.

The phantom picture above shows a view looking down through the top of the machine displaying the multiple V-belt drive, the Timken bearing swinging arbor and the vibration-proofed 8-hp air-cooled engine which powers the saw. The entire unit is completely protected against saw dust, has a 32 x 48-inch tilting table, and complete with saw and power unit weighs only 725 pounds, making it easy to move on the job and from job to job.

Complete information with specifications and price may be secured direct from Construction Machinery Co. by referring to this item.

Four Steel Fabricators Combine Facilities

In a move to serve the largest construction projects for defense or war purposes more quickly and efficiently four independent structural steel fabricating companies have combined their facilities without losing their individual identities. The cooperating companies are the Clinton Bridge Works, Clinton, Iowa; Duffin Iron Co., Gage Structural Steel Co. and Midland Structural Steel Co., all of Chicago. Together they have a capacity of 6,000 to 8,000 tons per month of fabricated structural steel.

The understanding between the four companies, formerly competitors, is based upon mutual confidence and trust. They have not entered into any legal combination or merger but proceed as follows: When an inquiry is received by any one of the four companies or the combination's headquarters, an estimate is made of the quantities and classification of work, then a conference is held at which a mutually agreed cost is determined. One of the companies prepares and submits a proposal to the customer based upon the cost as determined at the conference, at the same time advising the customer that the fabrication will be performed by one or more of the companies. If the proposal is accepted and the company submitting the proposal enters into a contract for its fulfillment, the customer is relieved of dealing with several companies.

The contracting company then issues its formal order to its associated companies covering their proportion of the contract, binding the subcontracting company to all the terms and conditions of its contract, and at the same rate of payment per ton or lump sum, subject to certain agreed deductions.

All companies are members of the

American Institute of Steel Construction, and operate in accordance with the Institute's code of standard practice. For simplicity and to identify their cooperation the companies are using the trade name "Four V Structural Steel Companies" with offices at 37 W. Van Buren St., Chicago, Ill., where inquiries should be addressed.

New Center Strip Uses Mastic Board

In line with the endeavor of manufacturers to produce highway materials not requiring the use of essential metals but furnishing a satisfactory alternate, Keystone Asphalt Products Co., 43 E. Ohio St., Chicago, Ill., has announced a new center strip for longitudinal and contraction joints in concrete highway and airport runway construction. The product made from asphalt mastic board is offered in designs conforming to current standards and is supplied in any required lengths and with desired punching for dowel pins and stake holes. This new center strip has a high tensile strength which facilitates handling on the job, and according to the manufacturer, provides a waterproof seal between the slabs. It is stated that it will not rust or deteriorate after years of service.

Complete information and prices of this asphalt mastic board center strip may be secured direct from the manufacturer by mentioning this item.

Shop Bulletin Board And War Advertising

The problem of many manufacturers whose production is now devoted 100 per cent to the war effort but to whom the after-war market is important has been to determine how to carry its message throughout the duration to its past and future market. Continental Rubber Works, Erie, Pa., has solved this in rather a novel method. It is working 100 per cent for defense, as all of its rubber products are sold only on high priority ratings.

In order to acquaint the men at the Continental factory with the importance of the work they are doing, to emphasize the importance and the need of spending every effort to save crude rubber, a bulletin board appeal was prepared and posted in the factory and copies sent to all Continental branches. The attention and response these bulletins received caused Charles J. Palmer, Advertising Manager, Continental Rubber Co., to decide to present exactly the same message to its future market by duplicating the bulletin as it appeared on the factory bulletin board as company advertising for the duration.

Glass as a Replacement For Some Critical Metals

As a result of the public discussion of impending and actual shortages of metals, plastics, and other materials as a result of the war, emergency search has been made by many industries for products that might readily prove a substitute or alternate for critical metals. In response to inquiries as to the part glass might play in this transition, Pittsburgh Plate Glass Co., Grant Building, Pittsburgh, Pa., has prepared a pamphlet "Glass and Its Adaptability to Modern Needs" which will be very helpful to many readers of CONTRACTORS AND ENGINEERS MONTHLY.

Copies may be secured free direct from the manufacturer by mentioning this item.

Conserving Vital Alloys

The conservation of the vital alloys for the war effort is of first concern in this country, and accordingly our research engineers are busily engaged in

discovering what materials can be used in their place in the many products necessary to the conduct of life but which must be subservient to our war needs.

In a new 4-page bulletin entitled "Pluramelt Conserves Vital Alloys," the Allegheny Ludlum Steel Corp., Pittsburgh, Penna., discusses the many uses of its product Pluramelt in order to conserve strategic alloys and to armor equipment against chemical or atmospheric corrosion, high-temperature oxidation, and abrasion and impact. Pluramelt is available in plates 3/16 inch and heavier, in sheets under 3/16 inch thick, and in strips of double armor, 0.031 inch and heavier, in 18-inch maximum widths. It is readily fabricated by the usual shop methods, and the manufacturer states that its behavior is the joint result of the characteristics of the two or more metallic materials of which it is composed.

New Pipe Tool Catalog

A new 28-page general catalog covering the complete line of Beaver portable pipe and bolt cutting and threading machines, power drives and power units, pipe cutting and threading tools from 1/8 to 12-inch, and other accessories has recently been issued by Beaver Pipe Tools, Inc., Warren, Ohio. The catalog is well illustrated to show the features of each machine and accessories, with clear text, specifications, order numbers and prices.

Copies of this catalog, Form 42, may be secured direct from Beaver.

Scientific Drainage With Metal Culverts

Where unstable roadbed conditions exist experience has shown that the fundamental cause is generally inadequate drainage. Young & Greenawalt, 1011 E. 148th St., East Chicago, Ind., offers a complete surface and sub-surface system of required drainage through its engineering, manufacturing and contracting divisions. Each particular problem is considered a specialized engineering job through design, production and installation of scientific drainage systems. While originally intended as a service for railroads Young & Greenawalt now offers its experience to highway departments.

Complete information on the Young & Greenawalt system of right-of-way drainage with corrugated metal culverts will be found in a new booklet just off the press which may be secured free from the manufacturer by anyone writing on his official or company letterhead and mentioning this item.

Marvel Is Distributor For Chausse Equipment

Marvel Equipment Manufacturers, Inc., 224 So. Michigan Ave., Chicago, Ill., is the national distributor for all Chausse equipment made by W. G. Chausse, 4453 14th St., Detroit, Mich., some of which was described on page 18 of our February issue. All inquiries about Chausse equipment should be directed to Marvel.

★ AN OPEN LETTER ★

to the many owners of

DAVENPORT LOCOMOTIVES • DAVENPORT-FRINK SNO-PLOWS • AND OTHER DAVENPORT EQUIPMENT

The entire Davenport organization is engrossed in the important task of producing locomotives and other vital war equipment for our Army and Navy—our Allies—American war industries—American railroads—and American builders of war projects.

We still can supply repair parts for maintaining the good condition of essential equipment and will cooperate with you to the limit toward this end.

To those responsible for snow removal, we URGE CONSIDERATION NOW of their requirements for NEXT WINTER. Orders placed EARLY have the best assurance of being completed and delivered when the time of NEED arrives. We invite your communications.

DAVENPORT LOCOMOTIVE WORKS

4220 Rockingham Road
DAVENPORT, IOWA

A Division of Davenport Basler Corporation

Bury WIRE • CABLE • CONDUIT •



There's no ditching to do

... no backfilling!

No Ditching! No Back-filling! Save on electric construction jobs—put wire, cable, or conduit underground as fast as the tractor travels—with a Killefer Wire Layer or Cable Layer. Buries electric lines 18 to 24 inches deep for airport

lighting systems, radio ground lines, telephone lines, and for power transmission ground lines. Killefer Wire or Cable Layers are built in four models—write for literature or see your nearest Graybar Electric dealer.

KILLEFER MFG. CORP., 3325 DOWNEY RD., LOS ANGELES, CAL.

Killefer Wire Layer

Bulk Cement Handling Features Taxiway Job

(Continued from page 1)

joints consist of a dummy groove made by inserting a 2 x 2-inch T iron and are poured with a bituminous filler. The steel at the expansion joint consists of 24-inch dowels, $\frac{3}{4}$ -inch round, spaced 15 inches apart and oiled for one-half the length and capped on one end. The transverse bars which support the dowels are $\frac{1}{2}$ -inch round or deformed bars, two being welded at 1 inch and 8 inches from one end and a third being tied 6 inches from the other end which is the oiled end and has the sleeve or cap. Non-extruding $\frac{3}{4}$ -inch premoulded expansion-joint material was used, tied to the setting device and dowel with string at intervals for its entire length. No steel reinforcing fabric was used, in spite of the fact that it is used practically universally by state highway departments for all types of pavements at the present time.

The center dowels across the longitudinal center joint are 24 inches long of $\frac{3}{4}$ -inch deformed steel placed 5 feet apart, while corner dowels were used in place of the "hairpins" used in some states.

Batching

The distinct novelty about this job was the handling of bulk cement, particularly the method in which it was placed in the trucks and the practically complete absence of spillage. The concrete aggregate used was the standard Platte River gravel and sand and was batched in the same setup used for the large quantity of concrete placed in the Aircraft Manufacturing and Assembly Plant. Two Northwest cranes unloaded the cars to stockpiles or loaded direct to the two-compartment bin of a Butler weighing and batching plant. This was so set that the batch trucks could run under the batch plant, receive their single batch and drive through, making a loop to the Butler cement plant. Each truck had an over-size body receiving the aggregate in the front part, the rear being covered for about 4 feet with a wooden cover to protect the cement. At about the middle of the truck two 2 x 2-inch angle irons were bolted to the truck about 8 inches apart. Bolted to these

angle irons at the center was a hopper 24 inches square at the top, 8 inches square at the bottom, and with a 12-inch spout at the bottom leading down toward the aggregate. The truck drove beneath the cement batching plant until the 8-inch stiff rubber tube from the batcher entered the top of the hopper in the truck and then the valve was opened, discharging the cement quickly into the truck without splashing and wasting cement as is so common on many highway jobs. The truck then drove straight through and out to the paver.

The aggregate for the concrete had the following gradation:

	Minimum	Maximum
Retained on 1-inch sieve	—	0
Retained on No. 4 sieve	10	55
Retained on No. 10 sieve	45	60
Retained on No. 20 sieve	60	80
Retained on No. 30 sieve	75	90
Retained on No. 100 sieve	95	100
Passing a No. 200 sieve (by washing)	—	2.8

The Paving Outfit

The thickened-edge trench for the job was cut by a Ted Carr form trencher and then the 9-inch Blaw-Knox steel forms were set by a boss form setter with an assistant who set the line, three form setters and three helpers. A subgrader was pulled over the forms to cut the grade to its final contour. The grade was sprinkled to prevent absorption of moisture from the concrete and the forms were oiled with a non-staining oil to prevent the forms sticking when being stripped. The subgrade was given a final compaction with a 6-ton tandem roller. In order to check the final grade in case it had been cut by trucks, the paver pulled a trail grader and two men were assigned to shovel out any excess material cut by this planer.

The batch trucks entered the forms where one had been removed and backed to the Koehring 27-E paver in which the concrete received a $1\frac{1}{2}$ -minute mix. The water for the paver was provided by two 1,500-gallon tank trucks. In the pit, two men set the steel and then the puddlers took over, two of whom shoveled to the strike-off of the double-screed finishing machine.

From a double rolling bridge two men operated a Cleveland 12-foot longitudinal float and behind them came two finishers who used a 10-foot wood drag straight-edge and long-handled floats for adjusting inequalities in the surface. They then pulled an 8-inch canvas belt saw-sawed along the surface to give it a gritty finish. The surface was then checked with one of what has now be-

(Concluded on next page)

Used Equipment Bargains

We are liquidating several large modern contracting outfits. Write or wire us for price and description on any item you need, or for complete lists. Equipment for sale includes:

Tractors—all sizes	Stone Chip Spreaders
Scrapers—4 to 20 yards	Tank Car Heaters
Rooters—Heavy Duty	Road Oil & Asphalt Heaters
Compressors—Gas & Diesel	Road Rollers
Concrete Mixers	Sheep's Foot Rollers
Self-priming Pumps	Elevating Graders
Power Units—Gas & Diesel	Motor & Blade Graders
Crushing & Screening Plants	Power-Driven Road Brooms

Bituminous Distributors

R. L. HARRISON CO.

Phone 8811

ALBUQUERQUE

NEW MEXICO

Highway for Fingerlings*



Many are the uses to which GOHI Corrugated Pipe has been adapted aside from the major task of highway drainage. Our illustration shows the inlet end of 36" GOHI Pipe in one of the New York State Conservation Commission Fish Hatcheries.

But, irrespective of their location and their use, this fact is indisputable — GOHI Corrugated Pipe gives superior, trouble-free service under the most severe conditions, because it is made of GOHI Pure Iron-Copper Alloy — the longest-lived, low-cost ferrous metal produced for the purpose. Get full details about GOHI. Copy of illustrated 72-page book on modern highway drainage practice on request. Contains valuable engineering data and technical information. Write the fabricator nearest you.

New England Bolt Co.	Everett, Mass.
Central Culvert Co.	Ottumwa, Iowa
Capital City Culvert Co.	Madison, Wisc.
Bancroft & Martin Rolling Mills Co.	S. Portland, Me.
Denver Steel & Iron Works Co.	Denver, Colo.
The Lane Pipe Corporation	Bath, N. Y.
Dixie Culvert Mfg. Co.	Little Rock, Ark.
St. Paul Corrugating Co.	St. Paul, Minn.
The Newport Culvert Co.	Newport, Ky.

*Small fish no longer than a finger.

GOHI PIPE

CORRUGATED

GOHI CULVERT MANUFACTURERS, INC.,
NEWPORT, KY.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Mall Service

MAKES MALL TOOLS

★ LAST LONGER ★
★ WORK BETTER ★
FOR DEFENSE

3 H.P. Concrete Vibrator

There is a MALL factory-trained representative in principal cities, with a complete stock of parts, waiting to service your MALL Tools.

With this convenient factory service available, there is no need to neglect your MALL Portable Power Tools. At the first sign that parts or service are needed, get in touch with the MALL Factory Service Base nearest you and keep your MALL Tools working longer and better for defense.

MALL TOOL COMPANY
7741 SOUTH CHICAGO AVE. CHICAGO, ILL.
Offices and Distributors in Principal Cities



Concreting Taxiways At New Bomber Plant

(Continued from preceding page)

come the most valuable pieces of property on the job, a Cleveland aluminum 10-foot straight-edge.

Behind the finishers a pair of Carr rolling bridges, with a plank nailed across between them along the center of the pavement, was used by three men to set the 2 x 2-inch T's for the poured center joint. After they had hand-floated along the joint a second 8-inch canvas belt was pulled over the surface of the slab.

The specifications required that no adjacent lane could be poured within 10 days of the time of pouring the first lane. Adjacent lanes are bonded by clipping a sheet metal keyway to the inside of the form and leaving the light metal in place.

The final finishing was done by two men and two helpers working from bridges, removing the joint caps from expansion joints and T-bars from contraction joints and the longitudinal joint. The pavement was cured with a light fog of Hunt Process curing material.

Personnel

The paving operations at the Aircraft Manufacturing and Assembly Plant are under the direction of the Omaha District Office, U. S. Engineer Dept., Lieut. Col. Helmer Swenholt, District Engineer, with Frederick C. Kendall as Project Engineer. The contractor for all of the work at the plant, including paving, was

Kiewit-Condon-Woods Construction Co. of Omaha, Nebraska, for whom Henry W. Knutzen was Project Manager and Ivan Bruensback, Field Superintendent in charge of paving.

A Concrete Form Tie For Irregular Walls

A new form tie designed to reduce the work in tying warped, arc and chord, battered, and multiple battered wall forms has been announced by Richmond Screw Anchor Co., Inc., 820-838 Liberty Ave., Brooklyn, N. Y. The Richmond Flex-Ty consists of pairs of strong cold-drawn wires welded at one end to a pre-formed wire coil nut or helix. The free ends of the two wires are held by a Flex-Ty clamp constructed with a hardened wedge-shaped bolt, the head of which rests against the two wires when the nut is drawn up tight.

These ties are made up in even half-foot or foot lengths beginning at 3 feet. A 3-foot long Flex-Ty with 2 x 6-inch studs and wales on edge will fit wall thicknesses up to 19 inches.

Complete information on how to install Flex-Tys with spacing data and unusual form conditions will be found in the Richmond Flex-Ty folder which may be secured direct from the manufacturer by mentioning CONTRACTORS AND ENGINEERS MONTHLY.

Improved Belt Repairs

By changing the design of its No. 28 conveyor belt vulcanizer The B. F. Goodrich Co., Akron, Ohio, has made it available for curing wider belts, as it may now be used with a square instead of a diagonal end. Widths of 34 inches can

be cured with the vulcanizer placed at right angles across the belt. By placing the vulcanizer at an angle of approximately 22 degrees a 28-inch belt can be cured, at an angle of 30 degrees, a 24-inch belt and at a 45-degree angle, a 16-inch belt.

The new design has a platen 11 inches by 36½ inches, overall length of 41 inches, overall height 23½ inches and weighs 380 pounds complete with sheet iron platen covers, curing pad and two 25-foot lengths of extension cord.

The new design is listed as Square End No. 28 while the older design was

known as Diagonal No. 28. Complete information may be secured direct from the manufacturer.

Chicago Office Moved

The Wellman Engineering Co., Cleveland, Ohio, has moved its Chicago Office to Room 1112, Merchandise Mart, 222 West North Bank Drive, Chicago. John E. Carlson of the Williams Bucket Division of Wellman Engineering Co. is in charge of Williams clamshell and dragline bucket sales and service at this branch office.

... CONTRACTORS WHO LOOK AHEAD are buying JAEGER PUMPS

The surest protection your money
can buy against pump breakdowns
and job delays . . .

— the best insurance a contractor
can have against the cost and
uncertainty of early replacement!



"I'M FASTER PRIMING
moved my shirt on pier hole
explosion."



"AFTER 1 YEAR, my Jaeger
is still going strong."



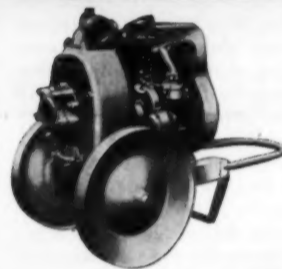
"EVERY UNIT FACTORY
TESTED AND CERTIFIED—
I can depend on Jaeger
performance."



"MY JAEGER SURE-
PRIME HAVE EVERY-
THING—Replaceable Liner
Plates to save me money.
A Seal I can inspect any
time in 30 seconds, a Shell
that really cleans itself."



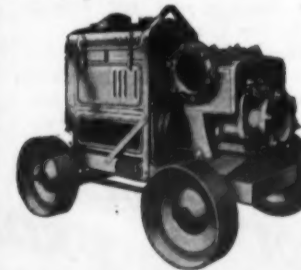
"I CAN GET FASTER
SERVICE ON PARTS
WHENEVER AND WHERE-
VER I NEED EM."



"SURE-PRIME" HEAVY DUTY
SMALL PUMPS: 2" and 3" units
that stand high pressures, contin-
uous pumping—many thousands
of hours.



"SURE-PRIME" PORTABLE 4"
AND 6" PUMPS: Capacities to
90,000 G. P. H. in compact, easy
handling units.



"SURE-PRIME" BIG CAPACITY
PUMPS: 8" and 10" sizes (125,000
to over 200,000 G. P. H.)—most
portable of big pumps.

THE JAEGER MACHINE COMPANY

781 DELUN AVENUE, COLUMBUS, OHIO

World's Largest Manufacturer of Construction Pumps—Mixer, Plaster, Grout, Seal, Mason, Concrete and Structural Forming Equipment.

NEW!
the Whiteman
**CONCRETE RODDING
MACHINE**

portable

Whiteman Precision Cement Floor Finishing Machine, gasoline model with a 2.5 HP Whiteman Air-Cooled Engine, net weight 187 lbs.

Equipped with Whiteman 2.5 Air-Cooled Gasoline Engine, weight 187 lbs.

One of the hardest and most difficult operations in the laying of concrete floors, and one that has always been looked upon more or less with disdain, is rodding. For years men associated with concrete have desired that someone might develop an idea which would result in the elimination of this backbreaking operation.

After many months of research and experimenting to produce this much-needed piece of equipment, the Whiteman Manufacturing Company has finally developed a portable concrete rodding machine which has been given thorough and complete tests on some of the largest jobs in Southern California.

When you stop to consider that the average pour—which will enable your men to rod without too much difficulty—is from a four to six inch slump, you will readily visualize the advantages of a machine that will enable you to handle concrete of a 1½ inch slump. The Whiteman Portable Concrete Rodding Machine will rod your

floors accurately, using for screeds the standard screeds that you would ordinarily use if you were rodding by hand. Not only will it rod your floors to a perfect level, but at the same time the action puddles and condenses your concrete into a solid mass through the entire depth and over the whole area, bringing the moisture to the surface, preparatory to using the Whiteman Precision Cement Floor Finishing Machine. You can now have that low-slump concrete that builders and architects have so long desired, at even less cost than the obsolete method of hand-rod your concrete.

1. Floors Rodded Perfectly Level
2. Puddled and Vibrated into Solid Mass
3. Moisture Brought to the Surface
4. Very Low Slump, Concrete As Low as 1"
5. Speed—A Wartime Necessity
6. Results—A Properly Prepared Floor

For the name of your nearest dealer—write

WHITEMAN MANUFACTURING COMPANY

Dept. C, 3249 Casitas Avenue

LOS ANGELES, CALIFORNIA

Alternate Routes Keep British Traffic Moving

(Continued from page 1)

mood and pre-occupations that the peacetime "Ministry of Transport," which included highways among its prerogatives, has now been transformed into the "Ministry of War Transport". In this atmosphere the construction of new roads will not be encouraged unless conclusive evidence can be adduced that the outlay will serve an unchallengeable military purpose, e.g., access to airfields or camps. A strong case can often be made out in wartime for the building of bridges or subways (underpasses) at busy level crossings where any mishap may gravely disorganize and delay the traffic on both road and railway. Motorways will not figure on our roadmap until victory is won.

Some degree of priority will probably be assigned to the completion of important arterial roads left unfinished after the closing down of earlier unemployment programmes, e.g., the Greater London Arterial Road programme which was formulated thirty years ago. While dock and railway schemes are usually judged upon their intrinsic merits, the value of a road project is more commonly assessed by politicians upon its immediate effectiveness as a means of employing unskilled labour in cycles of trade depression. Every important national campaign of road building has hitherto owed its origin to the prevalence of unemployment, and as soon as trade prospects brighten, the schemes are often allowed to remain unfinished.

Our national leaders may well consider, therefore, that the demobilization of vast armies after the present war will afford a more appropriate opportunity than the present for launching an ambitious programme of highway construction. Should this come to pass, the enterprise would be attended by fewer obstacles than was the case in 1919, seeing that the Government have now assumed entire responsibility for nearly 5,000 miles of all-important trunk roads which were formerly administered by County Councils and Municipal Authorities. The improvement and extension of these highways will not therefore in the future be preceded by the protracted bout of financial bargaining in which the Ministry of Transport and County Councils were wont to engage for a year or two before work could be put in hand.

Trunk roads connecting the capital with the great ports should have the first claim on funds available. Immediately below the trunk roads, in order of priority, come the first and second class roads, for the essential maintenance of which some financial provision is indispensable, however frugally measured. Attention will have to be concentrated on the technique of timely patching, so that surface damage may not extend downwards to the foundations.

Improvements of any magnitude are hardly likely to be favored by the Local Highway Authorities with whom the initiative rests, nor is aid on any substan-

tial scale to be expected from the Government's Road Fund, save in areas subject to exceptionally heavy military traffic. Special grants will have to be assigned to secluded highland and moorland districts in Scotland and Wales where roads are weak and weather conditions adverse. Roads of lesser categories, including residential streets, can hope for little sympathy.

Benefit of Past Programmes

Fortunately our highways are today better prepared to sustain the stress of military traffic than they were during the lean years of 1914-1918 when an overwhelming proportion of our road mileage was surfaced with water-bound macadam,—now supplanted in large measure by more durable materials such

as concrete and bituminous mixtures. Unmetalled earth roads which play an important part in the communications of more recently developed countries are no longer to be found in Britain. The age-long labours of road-builders have, moreover, furnished us with such a close network of roads that there is usually no difficulty whatever in finding a variety of alternative routes in the event of any road becoming foundeuous or temporarily blocked by bomb craters.

Now, too, we shall reap the benefit of several hundred miles of arterial roads and by-passes, 100 feet and upwards in width, that have been built since the German defeat in 1918. Similarly, we may congratulate ourselves upon the widening and strengthening of nearly all our first and second class highways during the past 24 years. Grounds for sober satisfaction are therefore not wanting.

Checks on New Work

It has to be remembered that, even if ample funds could be placed at the road

engineer's disposal, a severe check would be imposed upon his activities by the lack of plant, materials and manpower, all of which are being diverted in greater or lesser degree to primary branches of war effort. Thus concrete mixers, power shovels, excavators, graders, dumpers, trucks and air-compressor plants of every type are urgently required for the building of airfields, munition works, camps and defense works generally; cement, gravel, sand

(Concluded on next page)



Big rubber tires enabled Contractor Robert J. Dill's Tournapulls to take to the highways without surface damage.

TOURNAPULLS Move 460 Miles on Own Power . . . SAVE OWNER \$1,000 IN FREIGHT

PROBLEM: Contractor Robert J. Dill had to move his Tournapulls from Mobile, Alabama, to a new job at Jacksonville, Florida—460 miles away. At the time he wanted to ship them, no flat cars were available, due to overcrowded freight facilities. Here's how he profitably solved the problem:

SOLUTION: With the cooperation of the Alabama and Florida State Highway Departments, Contractor Dill got okay to drive the four Tournapulls over the highways. The fast-moving rigs encountered no difficulties whatsoever and made the trip in four days, driving during daylight hours only.

RESULTS: Mr. Dill says, "For the total trip, covering salaries of four operators, their expenses, fuel, oil and grease . . . compared with shipping the Tournapulls by freight, plus cost of loading, blocking and unloading . . . we saved approximately \$1,000."

Only with fast-moving, rubber-tired equipment, like Tournapulls, can you make these savings in time, money and vital rail facilities. Keep in mind, too, the fact that Tournapull savings show up best on the job, where big yardages have to be moved fast, on long hauls. Your local LeTourneau—"Caterpillar" dealer can tell you more about that. Ask him about Tournapull profit possibilities . . . TODAY!

LETOURNEAU

CARRYALL* SCRAPERS, ANGLEDZERS*, BULL-DOZERS, ROOTERS*, POWER CONTROL UNITS, TRACTOR CRANES, PUSHDOZERS, SHEEP'S FOOT ROLLERS, TOURNAPULLS*, TOURNATRAILERS*, TOURNACRANES*.

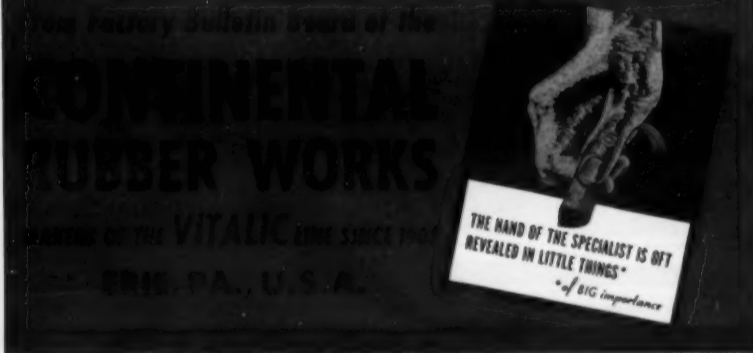
*Name Reg. U. S. Pat. Off.



WE ARE ALL ON THE FIRING LINE . . . NOW!

This war will be won by the "all out" teamwork of the men who fight and the men who work. Every product we produce for National defense has a direct bearing on victory. It may be hose for a navy yard on the Pacific, or rubber parts for a Detroit sub-contractor working on tanks, or airplane orders from Buffalo.

Continental customers well understand that their "civilian" needs must take second place to their war demands. Thus those who work, and those who wait, are also on "the firing line" in this fight which must not fail for the freedom of us all.



**ADDITIONAL
DEFENSE PRODUCTION**



ROGERS BROTHERS
CORPORATION
108 ORCHARD ST.
ALBION, PENNA.

REQUIRED . . .

1. FAST, DEEP, EXCAVATIONS,
2. THOUSANDS OF NEW FACTORIES,
3. MILLIONS OF ADDITIONAL KILOWATTS,

and **ROGERS
HEAVY DUTY
TRAILERS**

EXPERIENCE
Builds Own
PERFORMANCE
Sells 'Em.

PLAYED IMPORTANT PARTS
IN THESE PREPARATIONS

Only Essential Road Work Done In Britain

(Continued from preceding page)

and broken stone are needed in unlimited quantities for similar purposes; skilled road engineers take commissions in the regular forces, while more and more of the road men join up in their turn. Care must be taken that this process of transfer is not carried beyond danger-point.

With their depleted and ever dwindling staffs the highway authorities are plunging vigorously into national war work of great variety and complexity such as the construction of road blocks, shelters and defenses, salvage and clearance operations in bombed areas, the rehousing of the homeless, etc. Public Works contractors are equally busily engaged in similar tasks for which they are admirably fitted by their wide experience in the handling of engineering operations.

In this densely populated country, moreover, road projects on any comprehensive scale are hampered under war conditions by the reluctance to demolish serviceable buildings, having regard to the housing shortage already created in towns and villages by enemy air-raids.

It is true that in some ill-planned and congested areas the long-overdue process of remodelling will be facilitated by the effect of enemy action. Our highway engineers will certainly have a predominant voice in the re-shaping of those dingy quarters which disfigure so many of our cities, from London downwards, but although groups of planners are continually studying every phase of the bewildering problems that now confront us, no hasty action is likely to be taken. Prudence forbids us to assume that the full extent of damage by enemy action in our towns can yet be ascertained, and it would be unwise to base our plans on data that later may prove to be incomplete.

There is widespread recognition of the need for a general master-plan, to promote and control the regeneration of our unplanned cities. To meet this demand in the metropolis the government ordered a Highway Development Survey of Greater London to be prepared, and this was published in 1937.

Reduced Expenditures

Complete and detailed particulars of highway expenditure during the past two years of war are not obtainable, but some light is thrown on the subject in the "Road Fund Account for the Year ended March 31st, 1941" published by the Government in January, 1942. This shows that in the year during which war was declared grants made to highway authorities from the Road Fund amounted to over £12,000,000 but in 1940-1941 they were cut to just below £8,000,000, a reduction of one-third. Concurrently the expenditure on trunk roads was reduced by about £600,000, i.e. from £4,800,000 to £4,200,000—a cut of one-eighth. The road fund balance has increased from approximately £1,000,000 to £5,500,000, creating a valuable reserve for contingencies and

post-war renewals.

Less Travel on Roads

In forecasting the effects of a fall in highway expenditure, there is a reassuring factor to take into account, i.e. the concurrent diminution in various forms of road-traffic, whereby the wartime strain upon road surfaces is materially mitigated. Owing to the rigorous rationing of motor-spirit the mileage run by private cars and other automobiles is steadily dwindling; night travel is avoided on account of "blackout" risks; bus and coach services are being curtailed, or even suspended, on certain routes; deliveries by tradesmen vans are to be restricted.

According to the Secretary of the London Motor Cab Drivers' Union, London taxicabs are going out of service at the rate of more than thirty a week owing to the call-up of drivers for military service and war industry and to the growing difficulty of obtaining spare parts and tires. The compulsory annual overhaul now takes at least three months

instead of a week in peacetime, which means that large numbers are out of use. Today there are only about 4,000 taxi cabs in the London area,—less than half the number before the war. By next year there will be fewer than 2,000 left. Other types of vehicles besides taxi cabs will be subject to similar handicaps and will in their turn be withdrawn from active service.

The classes most severely hit by the unavoidable curtailment of travel facilities are the workers in munition factories and city offices, whose daily journeys between home and work-place are becoming more and more tiring,—sometimes, it may be feared, to the detriment of the workers' health and efficiency. Appeals are accordingly being made to shoppers to refrain from using trams and buses during the peak hours. If necessary, more rigorous measures will be taken for the protection of workers from needless travel strain.

In facing the road problems of the present war we gain assurance from lessons learned 25 years ago when similar

difficulties were successfully surmounted. Many of our leaders in the science of road engineering graduated in that hard school and have since broadened their experience by keeping in touch with the work of their colleagues in the United States. Up to the present, at any rate, judging by the columns of the press, the public have found no cause for complaint in the condition of the roads, and whatever further sacrifices may be demanded of British road users, the confident reply will be cheerfully forthcoming: "We can take it."

Air-Cooled Gas Engines

The Wisconsin VE-4 heavy duty air-cooled gas engine and other models for powering all types of construction equipment are described in detail in the latest series of engine folders released by Wisconsin Motor Corp., Milwaukee, Wis.

Copies of these folders will be furnished free on request to those specifying the size of engine in which they are interested.



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Equipped Truck Mixer

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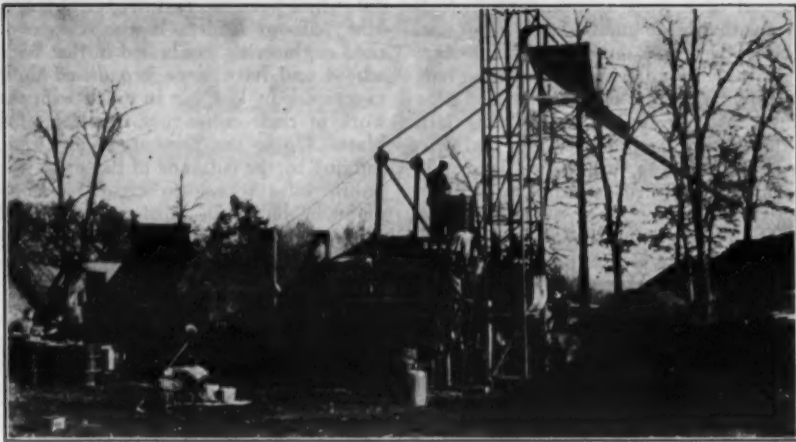
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The Mixermobile used by C. W. Blakeslee & Sons for producing stockpiles of Kotal-treated aggregate.

Asphaltic Stockpile Aids in War Effort

Recent national events have emphasized the importance of constant maintenance of roads and highways, particularly those giving access to airports and other military establishments, and equally of airport runways themselves. Whether traffic and weather or bomb craters be to blame for damage, the roads must be kept open to "keep 'em rolling" and the runways must be usable to "keep 'em flying".

The crux of any road or runway repair job in which speed is important is plenty of material on hand, and either a good big mixing plant ready to go into action at a moment's notice or a ready-mixed stockpile from which material can be trucked to the site is good insurance for the speedy completion of the required work.

A very timely success with asphalt stockpiles has recently been achieved at the plant of C. W. Blakeslee & Sons, Inc., New Haven, Conn., where a 2,000-ton stockpile was made up in the autumn and used effectively through the winter of 1940-41, some of it being used as late as May and June, 1941. This mix, made with Kotal, a new water-proofing agent for paving aggregates, remained pliable and workable all through the winter and yet set promptly on laying, it is reported. Despite low temperatures and bad weather, it was always possible to use this mix. Blakeslee & Sons are now producing this mix in a portable Mixermobile and prepared a 3,000-ton stockpile for their own use this winter, using an MC asphalt with undried crushed stone. The mix may also be made with graded gravel.

Complete details on Kotal and its use in preparing stockpiles of material for bituminous repairs may be secured direct from the Kotal Co., 52 Vanderbilt Ave., New York City, by mentioning this magazine.

Mulkey Succeeds Wirshing As Pacific Coast Manager

Herbert Wirshing, who has been in charge of the Pacific Coast business of the Waukesha Motor Co. of Waukesha, Wis., since direct branch operations were begun the Spring of 1932, has resigned. He is succeeded by A. G. Mulkey, who was formerly associated with Mr. Wirshing at the Los Angeles branch, and more recently has managed the Seattle branch office.

During Wirshing's long administration the branch activities expanded to such an extent that a new building combining warehouse and offices was erected in 1941 at 4927 Pacific Boulevard, Los Angeles, where nearly 8,000 square feet of space has been devoted to show room, offices, warehouse and service shops.

Wire Rope Information

A 4-page bulletin "Ropeology" has made its appearance as a service to users of wire rope. This bulletin is to be published from time to time by Macwhyte

Co., Kenosha, Wis., manufacturers of Monarch Whyte Strand wire rope.

The initial issue contains articles on the conservation of steel for defense, the value of wire rope service records, lubrication to lengthen wire rope service and a series of timely hints on ways to make your wire rope dollar go farther.

This first issue and those which are to follow will be sent as published to those readers of CONTRACTORS AND ENGINEERS MONTHLY who write direct to Macwhyte Co. on their business or official letterhead requesting that their names be placed on the mailing list.

Speeding Up Trucks With Heavy Loads

How heavily loaded trucks can increase their speed over hilly routes, yet cut down on their fuel consumption, was demonstrated recently in formal tests observed and certified by the Contest Board of the American Automobile Association. The paradoxical result of more speed on less gasoline was obtained by the use of an automatic booster engine added to a standard truck. Whenever grade and load conditions impose too great a burden on the truck engine, the booster engine cuts in automatically and adds its power to maintain road speed.

The AAA tests, one on Pikes Peak Highway and one at Berthoud Pass on U. S. 40, west of Denver, recorded the performance of a Chevrolet 1½-ton tractor unit equipped with a Clark automatic booster engine, towing a semi-trailer heavily loaded with steel plates.

In the Berthoud Pass test, a direct indication of the savings in time and fuel effected by the booster engine was obtained by running twice over the same route and distance, once with the truck acting alone and again with the truck engine and booster engine working together. The climb to Berthoud Pass is a steady 14-mile ascent of many turns and steep pitches, reaching an elevation of 11,315 feet. When the climb was made under the power of the truck engine alone, the time was 1 hour, 40 minutes and 5 seconds, at an average speed of 8.37 miles an hour and a gasoline consumption of 10.8 gallons. With the booster engine operating, the time was 58 minutes, 30 seconds, at an average speed of 14.36 miles an hour and a gasoline consumption of 8 gallons.

The Pikes Peak climb was primarily a reliability test of the booster engine and its automatic controls under conditions far more severe than would be encountered in ordinary use. Towing a 10-ton load of trailer plus payload and utilizing the power of the booster all the way, the Chevrolet covered the 20-mile ascent in 1 hour, 55 minutes, 20 seconds, at an average of 10.4 miles an hour up the steep climb to the summit which is 6,710 feet above the starting point and 14,110 feet above sea level. At the end of the non-stop run, the radiator temperature was only 10 degrees more than at the start.

The explanation of the fact that the

two engines do a better hill-climbing job yet use less gasoline than the truck engine working alone is that with the added power the truck can be operated in a higher gear. Therefore instead of running at wasteful high engine speeds, the truck engine runs within the range of speeds in which it is most efficient and economical.

The Clark automatic booster engine was installed in the regular truck chassis back of the cab and below the level of the body platform and delivered its power through the truck transmission and regular drive shaft. As long as the truck engine can maintain a road speed of 31 miles an hour or more in high gear, the booster engine does not start. When, however, the truck encounters a grade sufficient to cause it to slow down, with wide-open throttle, to 31 mph, the booster engine automatically starts and cuts in, adding its power to that of the main engine to maintain cruising speed. When the truck again reaches the speed of 45 miles an hour, the booster engine automatically cuts out. If the grade is



A Chevrolet 1½-ton tractor unit with a Clark automatic booster engine hauling a heavily-loaded semi-trailer on a test climb at Berthoud Pass, Colo.

so steep that, even with both engines in use, it becomes necessary to use third or second gear, the shifts are made in the ordinary manner and the booster engine still assists the main engine of the truck.

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Highway Engineers Discuss Roads and War

(Continued from page 37)

tration, we have redesigned our concrete roads, eliminating the use of mesh reinforcement and load transfer bars on contraction joints. We are now spacing them 20 feet instead of 40 feet and are still using expansion joints spaced 120 feet with load transfer devices. This leaves only the tie bars of the longitudinal joint of concrete pavement and the load transfer bars each 120 feet at expansion joints. This cuts our steel requirements to about 3 tons per mile.

"We are now redesigning our reinforced-concrete boxes and contemplate the use of unreinforced-concrete arches up to spans of 20 feet," adds Mr. Keefe. "At a great many points we will be able to substitute batteries of pipe, reinforced-concrete pipe or vitrified pipe since steel restrictions have curtailed the use of corrugated metal pipe. We are also working on designs of temporary structures on all spans above 20 feet, which we classify as separate contract structures. On these we contemplate the use of creosoted substructures and decks with concrete floors.

"On state roads which are off the strategic system, or are not classified as access roads, we contemplate using the above described designs on structures and the use of flexible-type-pavement roads to eliminate even the small amount of steel still in our design."

The Post-War Back-Log

Many state highway officials express the determination to hold together a design staff during this period of reduced highway construction to prepare a back-log of projects for post-war construction. Commissioner Cox of Connecticut stated, "It is my hope that we may be able to hold together an adequate design force to prepare construction plans at a normal rate in order that we may have an accumulation of such plans available if conditions of finances, materials and labor are such as to again accelerate our construction."

W. W. Mack, Chief Engineer, State Highway Department of Delaware, points out that, where funds are available and materials are unavailable, the funds on hand for construction which can not be used for that purpose should be made available for securing rights-of-way for post-war projects.

Commissioner Hoffmann of Minnesota points out that, "Sound planning for a post-emergency construction reserve also requires foresight in the development of a reserve of highway funds with which it can be financed. In Minnesota, which is extremely fortunate in that all its state highway revenues are constitutionally protected against diversion, \$3,000,000 of trunk highway construction money has already been placed in such a reserve. This fund will be supplemented from time to time as revenues accrue, in anticipation of its use with such Federal funds as might likewise accumulate. The ultimate total of such a reserve fund will depend of course upon the extent of emergency highway requirements and, on the other hand, the effects upon highway revenues of reduced travel, lessened gasoline consumption and restrictions upon new car purchases."

Robert A. Allen, State Highway Engineer of Nevada, states, "If Federal funds are made available in reasonable amounts, and we feel sure that they will be, then we can keep our highway personnel together, operating on improvements to the strategic military network, at the same time developing a back-log of highway projects needed for the improvement of the entire highway system, but not eligible for expenditure of

the limited strategic network and access road funds."

G. H. Henderson, Chief Highway Engineer in Rhode Island, says, "I believe that all available personnel should be and will be used in carrying out immediate work essential to the national defense and in building up a reserve of surveys, designs and plans for needed projects which can be utilized on short notice for any contemplated public-works program following the cessation of hostilities."

An All-Out Effort

R. A. Harris, Chief Engineer, Mississippi State Highway Department, is responsible for one of the best statements summarizing the thoughts of all state highway departments today. "All-out" to me means but one thing—"all-out"; and we in our highway endeavors are, in my opinion, scheduled to experience a very abrupt change shortly. Our efforts must be concentrated in one direction only, and we must not only rapidly learn to recognize the meaning of "all-out" but plan, now, our work and operations accordingly."

We are also indebted to Chris J. Sherlock, State Highway Director, Alabama State Highway Department, and to C. H. Purcell, State Highway Engineer, California Division of Highways, whose complete statements appeared in the February issue of CONTRACTORS AND ENGINEERS MONTHLY, and to the following who replied but whose discussions are not quoted directly: F. R. White, Chief Engineer, Iowa State Highway Commission; R. W. Coburn, Chief Engineer, Massachusetts Department of Public Works; C. R. McMillan, State Highway Engineer of South Carolina; D. C. Greer, State Highway Engineer, Texas Highway Department; H. E. Sargent, Commissioner, Vermont Department of Highways; C. S. Muller, Chief Engineer, Virginia Department of Highways; and T. C. Frame, Chief Engineer, Pennsylvania Department of Highways.

Jacks for All Purposes

The many services which jacks can perform on construction operations are well known to field men. Simplex jacks, made by Templeton, Kenly & Co., 1020 S. Central Ave., Chicago, Ill., are built in many types and styles to meet these varying requirements. These include Simplex ball-bearing screw jacks and journal jacks, automatic lowering jacks,

geared, emergency and electrified track jacks, push and pull jacks, steamboat ratchet pulling jacks, hydraulic jacks, shoring jacks and drop-forged timber and trench braces.

A copy of Simplex Catalog 41 containing complete information on these jacks will be forwarded immediately to those writing to the manufacturer on their business or official letterhead and mentioning this item.

Air Compressor Bulletin

The fourth edition of the Gardner-Denver portable air compressor bulletin PC-11 is now available to readers of CONTRACTORS AND ENGINEERS MONTHLY. It describes in considerable detail, with many illustrations, the features of Gardner-Denver two-stage water-cooled portable compressors in various mountings, with tabulated specifications.



Work on access roads, housing projects, highways and other construction on our Victory program is on the increase... additional equipment must be bought in many cases. Galion is first choice on jobs which must be done quickly and efficiently. Rollers—Motor Graders—Spreaders.

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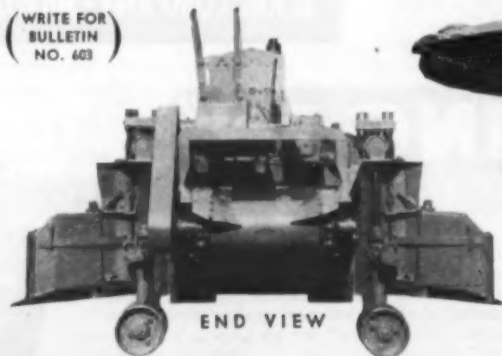
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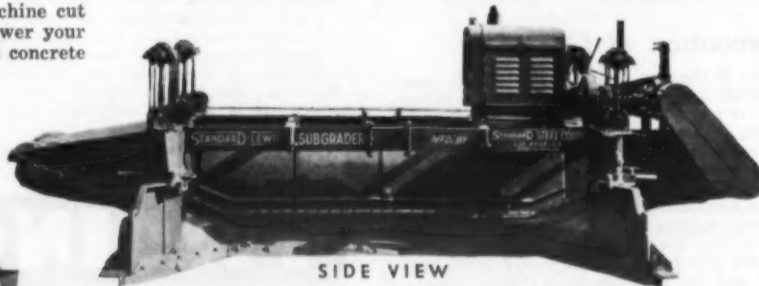
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Avoid Legal Pitfalls

These brief abstracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

Edited by A. L. H. STREET, Attorney-at-Law.

Supervising Engineers Are Not Omnipotent

A supervising engineer on a road construction job does not become a czar because the contract empowers him "to make such changes and alterations in the plans or in the quantities of the work as may be considered necessary or desirable", etc. At least, that was the view taken by the Texas Court of Civil Appeals in the case of Martin Brothers v. State, 146 S. W. 2d, 782.

The court decided that the quoted clause did not empower the engineer on a state highway job to alter plans covering a 15-mile stretch as to require the contractor to leave 360 trees on the right-of-way, whereas only 26 trees were shown by the original plans. It was shown that the change was of such nature as naturally to prevent the contractor from using heavy excavating machinery, etc., that could have been economically used had the original plans been followed. The court said:

"The net result of such changes, under the circumstances, would be a material alteration of the terms of the contract itself. This engineer had no authority to do. . . . If, therefore, the changes made in the plans by the engineer required of the contract additional labor and expense beyond that provided for in the contract, the contractors were entitled to be compensated therefor as for extra work."

The court added that a clause of the contract, dealing with "clearing and grubbing", related only to the preliminary work of clearing the highway and did not enlarge the engineer's powers as to changes in the plans as to permanent construction work.

Right to Withdraw Bid Because of Mistake

Those interested in the subject of withdrawal of bids on public jobs should read the full text of the decision rendered by the United States District Court for Connecticut in the case of State of Connecticut v. F. H. McGraw & Co., 41 Fed. Supp. 369.

In that case the State sued on a bond given by the defendant as a bidder on a contract to build the substructure of a bridge. The defendant contractor excused refusal to enter into the contract on the ground that the State unjustifiably sought to compel the defendant to use compressed air in the construction of a pier. The court decided that the specifications could be so read as to require use of compressed air, but exonerated the contractor on the ground that when the contractor placed its bid, it honestly believed that its proposed method of doing the work would be within the specifications, and the state officials who accepted the bid were aware of that belief.

The court ruled that neither the fact that this was a government job nor that the bidding specifications forbade withdrawal of bids altered the case, saying: "Of course, it is obvious, as the State contends, that the system of public bidding, developed by experience and usual in public contracts, should not be broken down by lightly permitting bidders to withdraw because of change of mind. Such a course would be unfair to other straightforward bidders, as well as disruptive of public business. But it can hardly be a substantial impairment of such system to grant the relief—which would clearly be given as between private citizens—in a case where a bona fide mistake is proven and was known to the State before acceptance or any loss of it."

Revocation of Licenses

One of the first, if not the very first, case in which an appellate court has been called upon to pass upon the validity of an order revoking a public work contractor's state license, was recently decided by the Arizona Supreme Court—Lee Moor Contracting Co. v. Hardwicke, 106 Pac. 2d, 332.

The contracting company's license under the Arizona statutes was revoked by the State Registrar on the ground that the company had violated a state law by employing a non-resident and an alien on Federal-Aid highway projects. The Superior Court at Phoenix upheld the Registrar's action but, on further appeal taken by the company, the order of revocation was vacated by the Supreme Court, which decided: Under the Arizona licensing law, a contractor's license may be suspended or revoked on proof of violation of a statute governing contractors, although he has not been first convicted in a prosecution for such violation. The Registrar could determine in an independent proceeding whether or not there had been a violation of a statute. Statutes governing the performance of public contracts automatically become part of such contracts, although not mentioned in the contracts.

But, in this case, the Supreme Court decided there was no violation of any statute by the contracting company, and therefore no basis for revocation of the company's license, because the Arizona statutes governing employment of non-resident labor, etc., make exceptions in the case of Federal-Aid projects, and the labor employed by the company fell within that exception.

Third Party Interest in Construction Contracts

A sewer contracting firm got hooked on a rule of law that ought to be known to every contractor. This rule of law is to the effect that one for whose benefit a contract was made, although he is not a party to the contract, can enforce legal rights under it.

It was part of the contractor's bargain with the city of Duluth that, since it was likely that blasting would cause injury "in the immediate vicinity", the contractor should be "liable for any damages done to the work or other structure or public or private property and injuries sustained by persons" in the course of the work.

The plaintiff, owner of real estate near the sewer site, sued for damages to the property due to blasting operations carried on by the contractor. Apparently, there was no claim that the blasting was done carelessly. The suit relied on the above-mentioned provisions of the contract as giving plaintiff a right to sue. The contractor replied that there was no contract with the plaintiff and therefore no contractual liability to him.

The Minnesota Supreme Court upholds the right of a property owner to recover in such cases (La Mourea v. Rhodge, 295 N. W. 304.) The court notes that the old legal notion that a stranger to a contract could not enforce any right under it, although the contract was made for his benefit, is no longer fashionable. All of which goes to show that Old Man Law and Old Man Justice pal together more than they used to.

Who Was the Employer?

The mere fact that a contractor carries insurance upon his liability to pay workmen's compensation for accidental injuries does not justify his assuming that he need not concern himself further about compensation angles. If he is not wary, he may find that he is paying premiums on workers to whom he is not liable under the compensation act, or he may be liable for injuries to men on whom he has no insurance protection.

Illustration of one phase of this subject is afforded by a decision of the Minnesota Supreme Court in the case of Finn v. Phillippi Bros., 300 N. W. 441. In that case a trucking company contracted with a highway contractor to haul gravel and other materials and dump it along the line of work. The company's pay was based upon ton-mileage, from which the contractor paid the drivers of the truck, but the contract reserved to the trucking company control over the drivers. One of the drivers was fatally injured. The question arose who was his employer, for the purposes of compensation liability. The court decided that the trucking company was the employer, and that, therefore, that company's insurer was liable.

Delivering Business Notices

When circumstances require a contractor to issue a notice to another person, in the course of performing a contract, and there is no statutory requirement as to just how the notice shall be given, it is desirable that the notice be delivered either by registered mail or personally. It is risky to rely upon unregistered mailing.

The foregoing observations are inspired on

reading the decision rendered by the Kentucky Court of Appeals in the case of Campbell v. Snyder, 154 S. W. 2d, 724. There the evidence showed that, while a road subcontractor's work was suspended, the contractors agreed to notify him when it was desired that work should be resumed. In a suit in which the contractors sought to hold the subcontractor liable for damages resulting from his failure to complete the work, the contractors claimed that they mailed a notice to the "sub" to resume work. He denied receiving the notice and thereby defeated the contractors' contention that he was at fault.

The Court of Appeals applied the general rule of law that, when it is important to show that a business letter was received, proof that the letter was mailed, properly addressed and stamped and bearing a return address, and that it was not returned, will raise a legal presumption that the addressee received the letter. But, when the addressee denies that he received the letter and there are no circumstances to contradict him, other than the mere fact of the mailing of the letter, the presumption is overcome.

When a notice is served personally, a record of the time and place of service and of the name of the person served should be kept, against the possibility of a denial that service was made.

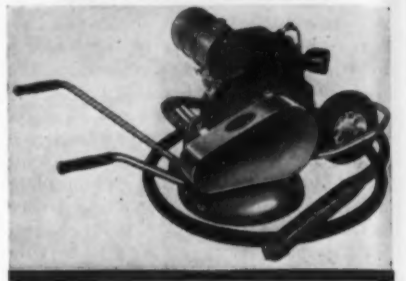
Damages Collectible When Work Is Taken Over

When an owner or general contractor takes over a job for completion, in case of default by a contractor toward the owner or of a default by a subcontractor toward the contractor, it is a mistake to suppose that the amount of damages assessable against the defaulting party is necessarily to be figured on a basis of the actual cost of completing the job. The proper basis is the reasonable cost.

In the case of Campbell v. Snyder, 154 S. W. 2d, 724, decided by the Kentucky Court of Appeals, a subcontractor on a road job sued for a balance due, and the contractors counter-claimed for damages on the ground that the subcontractor had defaulted by failing to complete his undertaking. On the contractors' appeal from a decision in the subcontractor's favor, the contractors objected that there was no contradiction of their evidence as to what

it cost them to complete the job. The Court of Appeals replied that even if that were true, there was a contradiction in the evidence as to just how much work was left undone by the subcontractor. Hence, the court said, the contractors were entitled to recover "not what they may have seen cause to expend in completing appellee's work, but to recover only what was reasonably necessary for them to complete the work."

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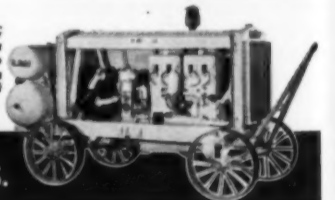
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The inherent ability of OWEN buckets to consistently obtain capacity grabs in all kinds of material, plus the rapid dumping action as a result of special shell curvatures, makes such a job as is pictured here literally "duck soup" for an Owen.

THE OWEN BUCKET COMPANY • 6030 Breakwater Ave., Cleveland, O.

BRANCHES: New York, Philadelphia, Chicago, Berkeley, Calif.

OWEN BUCKETS GET A MOUTHFUL AT EVERY BITE



Directory of EQUIPMENT DISTRIBUTORS

The following cards (arranged by states) show the names of dealers in contractors' equipment and supplies, with a record of various lines handled.

GARLINGHOUSE BROS.

2416 E. 16th St. Los Angeles, Calif.

Southern California Distributors for

BROWNING—Truck Cranes, Shovels, Locomotive Cranes
DEMPSTER—Dumpsters
DIAMOND IRON WORKS—Crushers, Portable Gravel
Flasks
DAVEY—Compressors
LAMBERT-NATIONAL—Hoists and Cableways
MCKERNAN-TERRY CORP.—Pile Drivers
A. LESCHEN & SONS—Wire Ropes
NORRIS—Engines, Pumps, etc.
OMAHA—Drumline Buckets
OWEN—Clamshell Buckets
RANSOME—Concrete Mixers, Pavers, etc.
UNIVERSAL—Panel Forms, Form Clamps, etc.

Manufacturers of
GAR-BRO—Concrete Carts, Wheelbarrows, Concrete Hoppers, Buckets, etc.

EDWARD R. BACON CO.

Folsom at 17th St.

San Francisco, Calif.

Aeroli Emulsion Distrib. Littleford Wheel Rollers
American Concrete Grinders McKernan-Terry Pile Drivers
"Berg" Concrete Surfaces
Byers Shovels, Cranes, Maries
Cleveland Trainers Draglines
Dobbs Derrick, Fittings Nelson Bucket Loaders
Erie Rollers Ohio Locomotive Cranes
Gar-Bro Barrows, Carts Page Dragline Buckets
Hercules Power Units Porta Conveyors
Hughes Sweepers Ramsey Winches
Huber Rollers Rogers Bros. Trailers
Interstate Trailways Symons Cone Crushers, Vibrating Screens
Jackson Concrete Vibrators J. Jaeger Mixers, Pumps, Hoists, Paving Equip.
Jones Saw Batches, etc. Toledo Trenches
Kiesler Clamshell Buckets Windrow Flows
Kohler Lighting Plants Winslow Scales

Member: Associated Equipment Distributors

NORRIS K. DAVIS

400 Seventh St. San Francisco, Calif.

Representing

DAVIS COMPANY—Large Tilling Mixers, 1, 2, 3, and 4-yd., Weigh Batches, Batching Plants, Manual or Full Automatic Operation, Ready-mix Concrete Plants and Equipment, Motor Truck Concrete Mixers and Carriers, Electrically Operated and Controlled Water Meters, Bins, Hoppers, etc.
W. E. GRACE MFG. CO.—Road Sweepers
HANSON CLUTCH & MACHY CO.—Full Reversing Shovels, Cranes, Draglines, 1/2, 3/4, 1, and 1 1/2-yd.
LE ROI CO.—Gasoline Power Units and Parts
MINK, BTL. & MACHY CO.—Twin City Engines, parts
NORTHERN CONVEYOR CO.—Stationary or Portable Conveyor Units
O. K. CLUTCH & MACHY CO.—Hoists & Compressors
SNOW REMOVAL EQ. CO.—Retractable and Sierra Snow Flows
THE EARL WALKER CO. INC.—Hd. Oilers, Walker Bars

HARRON, RICKARD & McCONE COMPANY

2070 Bryant St., San Francisco
3850 Santa Fe Ave., Los Angeles

Representing

American—Hoisting Equipment
"Broderick & Bascom"—Wire Ropes
E. & O.—Dippers, Dragline Buckets, etc.
Estlin—Plaster Mixers
Rollers, Hoists
Gorman-Rupp—Pumps
Inley—Excavators
C. S. Johnson—Bins and Batches
Kohring—Shovels, Mixers, etc.

Member: Associated Equipment Distributors

THE PAVING SUPPLY AND EQUIPMENT COMPANY

10th & Girard Sts. N.E., Washington, D.C.

Representing

657-59 East 25th St., Baltimore, Md.
J. D. Adams Co.
Barber-Greene Co.
Buckeye Traction Ditcher Co.
Bucyrus-Erie Co.
Buffalo-Springfield Roller Co.
C. H. & E. Mfg. Co.
Cleveland-Brooks Co.
Construction Machinery Co.
International Harvester Co.
Kinney Manufacturing Co.

Everything in construction equipment.

Member: Associated Equipment Distributors

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1030 N. Miami Ave., Miami, Florida

Allied Companies
Atlas Imp. Diesel Eng. Co.
Austin-Western Rd. Machy. Co.
Barber-Greene Co.
Bostons Mfg. Co.
Browning Mfg. Co., Inc.
Century Electric Co.
Climax Engrg. Co.
Comm'l Shoring & Stamping Co.
Cooper Mfg. Co.
Crescent-Wheeler Elec. Mfg. Co.
Henry Dierksen & Sons, Inc.
Dodge Mfg. Corp.
Farm & Home Machy. Co.
Goulds Pumps, Inc.
W. W. Grainger, Inc.
Independent Pneu. Tool Co.
Ingersoll-Rand Co.
Jaeger Machine Co.
E. E. Johnson, Inc.
LeRoy Co.
Link-Belt Co.

YANCEY BROTHERS, INC.

634 Whitehall St., S. W.
Atlanta, Ga.

American Manganese Jaws
American Cable Wire Rope
Barber-Greene Ditchers, Conveyors, Asphalt Equipment
Barnes Pumps
Buffalo-Springfield Rollers
"Caterpillar" Tractors, Graders, Power Units, etc.
Cedar Rapids Crushers
Clyde Hoists
Conveyer Kettles, Tools
Dixie Saw Rigs
Grace Sweepers, Tank Car Hoists
Ingersoll-Rand Air Compressors, Air Tools
Jaeger Vibrators
Johnson Bins, Batches, Bulk Cement Plants
Killer Rippers, Harrows, Drag Scrapers, Flows
Kinney Asphalt Distributors
Lapland-Choate Bulldozers, Trailbuilders, Tamping Rollers
LeTourneau Carry-all Scrapers, Angledrums, Roadsters
Metform Road, Sidewalk, Curb & Gutter Forms
Page Dragline Buckets
Red Edge Shovels
Red Star Wheelbarrows, Concrete Carts
Saw Mixers, Pumps, Pavers
Russell Road Flows
Thew-Lorain Shovels
Timken Drill Bits & Rods
Ward Road Flows
"Williams" Buckets

Member: Associated Equipment Distributors

F. H. BURLEW COMPANY

3401 South Hoyne Ave., Chicago, Ill.

Telephone: Virginia 1100

BATES Wire Ties, etc.
BYERS Crawler Cranes, Shovels, Draglines
BEEBE BROS. Hoists
CHAIN BELT Mixers, Pavers, Pumps, Elevators
Pumpcrete, Sump Mixers
ERIE Steel Bins, Batches, Aggregators
McKernan-Terry Corp. (Divisions)
MCKERNAN-TERRY—Pile Drivers, Extractors
LAMBERT-NATIONAL—Hoists, Cableways
STEELE & CONDUCT—Special Machinery

Wheelbarrows, Hose, Cable Ropes, Taraulins, Vibrators, etc., carried in stock

Member: Associated Equipment Distributors

CHICAGO CONSTRUCTION EQUIPMENT COMPANY

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Sales—Rentals—Service

Aeroli—Tar Kettles
Garvey—Centrifugal Pumps
Carter—"Hundingers"—Conveyors & Diaphragm Pumps
Centaur—Hi-Way Motors
C. H. & E.—Saw Rigs, Hoists
Cleveland—Rock Drills, Paving Breakers, Air Tools
F. & M.—Crawlers
Gallon—Hd. Machy., Graders, Motor Patrols, Hoists, Sand, Chip Spreaders
Sheepfoot Rollers
Kiesler—Clamshell Buckets
Kohler—Generators, Lighting Plants
Le Roy—Air Compressors
Lecher—Hercules Red Strand Wire Ropes
Michigan—Power Shovel, Truck Cranes, Truck Shovels
Owen—Clamshell Buckets
Page—Dragline Buckets
P. & M.—Crawlers
Russell—Universal Sumpers
Huber Mfg. Co.
Inley Mfg. Co.
C. S. Johnson Co.
Kehring Co.

Belting, Rubber Hose, Road Torches, Wheelbarrows, Scoops, Spades, Shovels, Tools, Supplies

O. T. CHRISTERSON CO.

3900 So. Wabash Ave. Chicago, Ill.

Representing

BLAW-KNOX—Road Forms, Bins, Batches, Finishing Machines, Buckets, Truck Mixers, Spreaders, Vibrators
C. H. & E.—Road Pumps, Saw Rigs, 2-Ton Rollers
CHICAGO PNEUMATIC TOOL CO.—Compressors, Air Tools, Hose
CLEVELAND—Subgraders, Straight Edges, Finishing Tools
GORMAN-RUPP—Self Priming Centrifugal Pumps, Road Pumps
INSLEY MFG. CO.—Cranes, Shovels, Wagons, Cams, Carts, Derrick, Concrete Buckets
KOEHRING—Mixers, Pavers, Cranes, Shovels, Dumpsters, Mud Jacks, Trail Dumps, Wheelers, Longitudinal Finisher
KWIK-MIX—Concrete and Bituminous Mixers
PARSONS—Trench Machines, Backfillers, Turbo Mixers

Concrete Carts, Wheelbarrows, Supplies

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400 Franklin Street Peoria, Illinois

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Athey Truss Wheel Co.
Caterpillar Tractor Co.
Killer Mfg. Corp.
Lapland-Choate Mfg. Co.
R. G. LeTourneau, Inc.
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Trackson Co.
Willamette Hystr Co.
Universal Crusher Company

Telephone 6177

INDIANA EQUIP. CO., INC.

327-329 West Market St., Indianapolis, Ind.

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ATHEY TRUSS—Wagons, Bulldozers
BUFFALO-SPRINGFIELD Bulldozers
"CATERPILLAR"—Road Machinery
"CATERPILLAR"—Tractor
CHAIN BELT CO.—Mixers, Pumps
DIAMOND—Crushers, Screens
LAPLAND-CHOATE—Wagons, Scrapers, Bulldozers
LE TOURNEAU—Scrapers, Buggies, Bulldozers
OWEN—Clamshell Buckets
PAGE—Dragline Buckets
SAUERMAN—Cableways, Power Scrapers
SULLIVAN MACHY—Air Compressors
THEW—Shovels, Draglines

Member: Associated Equipment Distributors

GIERKE-ROBINSON CO.

4th & Ripley Sts. Davenport, Iowa

Representing

BARCO—Gasoline Hammers
BLAW-KNOX—Steel Road, Curb and Gutter Forms, Bins, Batches, Clamshell Buckets, Truck Turntables, and Concrete Road Finishers
CHAIN BELT—Mixers, Pavers, Pumps, Elevators
CLYDE—Gasoline and Steam Hoists, Derrick
LITTLEFORD—Hoists, Kettles, Bituminous Distributors
SULLIVAN—Air Compressors, Tools
TRACKSON—Crawlers, Shovels and Bulldozers
THEW-LORAIN—Cranes, Shovels, Draglines
TIMKEN—Detachable Rock Bits, Steels
UNIVERSAL—Truck Cranes
UNIVERSAL—Form Clamps
WHITE—Vibrators

Member: Associated Equipment Distributors

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309 Magazine Street New Orleans, La.

American Mfg. Co.
Bethlehem Steel Co.
Bates Valve Bag Corp.
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Diamond Iron Works
Gardner-Denver Co.
The German-Rupp Co.
Inley Mfg. Co.
The Jaeger Machine Co.
Jones Superior Machine Co.
C. S. Johnson Co.
Kehring Co.
Kwik-Mix Mixer Co.
Littleford Bros.
M & W Wire Clamp Co.
Mail Tool Co.
Owen Bucket Co.
Parsons Co.
Page Engineering Co.
Jos. O. Pollard Co.
Sagen Derrick Co.
Sauerman Bros., Inc.
Sterling Wheelbarrow Co.
Teledo Pressed Steel Co.
Templeton, Kenly & Co., Inc.
Van Dorn Iron Works Co.
Wood Shovel & Tool Co.

Member: Associated Equipment Distributors

ALBAN TRACTOR CO., INC.

725-27 East 25th St. Baltimore, Md.

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CATERPILLAR TRACTORS AND ROAD MACHINERY
ATHEY TRUSS WHEEL CO.
JOHN DEERE Industrial and Agricultural Equipment
GARDNER-DENVER CO.
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HERCULES ROLLER CO.
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KILLER MFG. CORP.
LAPLAND-CHOATE MFG. CO.
OSGOOD CO. Shovels, Cranes, Draglines
PIONEER-ENGGR. WKS., INC.
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Hugh-Universal Sumpers
Huber Mfg. Co.
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Kehring Co.
Kwik-Mix Co.
Lambert-National Hoists
Linn Mfg. Corp.
McKernan-Terry Corp.
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Red-Prentiss Corp.
Sauerman Bros. Inc.
Syntron Co.
Trusson Steel Co.
Werthington Pump & Machy. Corp.

Member: Associated Equipment Distributors

JOHN C. LOUIS COMPANY

511 W. Pratt St. Baltimore, Md.

4821 Bethesda Ave. Bethesda, Md.

Representing

AMERICAN CABLE—Tray Wire Ropes
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CENTAUR—Road Mowers
CLEVELAND—Paving Breakers, Sinkers, Drills
GALLION—Leaning Wheel Graders
GENERAL—Wheelbarrows
GARDNER—Crushers, Snow Plows
JAEGER—Concrete Mixers, Pumps, Truck Mixers, etc.

Member: Associated Equipment Distributors

McCLUNG-LOGAN EQUIPMENT CO., INC.

Key Highway & McComas St., Baltimore, Md.

Sales—Service—Rentals

Allis-Chalmers—Tractors, Graders, Power Units
Baker—Scrapers, Bulldozers, Trailbuilders, Snow Plows
Buckeye—Fingergraders, Spreaders, Ditchers, Backfillers
C. H. & E.—Saw Rigs
Chain Belt (Rex)—Mixers, Pavers, Pumps, Pumpcrete
Chicago Pneumatic—Compressors, Drills, Breakers, Pneumatic and Electric Tools
Cleveland—Formgraders, Form Tampers
Euclid—Wagons, Bulldozers
Gar Wood—Sweepers, Bulldozers, Trailbuilders
Grace—Road Sweepers
Hais—Loaders, Conveyors, Buckets
Hughes—Shovel
Iowa—Quarry Sand & Gravel Equipment, Black Top Plants
Jones & Laughlin—Gilmore Wire Rope
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Page—Dragline Shovels, Bins
Wiley—Whirlies, Steel Barges, Conc. Buckets, etc.

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Lidgerwood Mfg. Co.
Lima Locomotive Works
Master Vibrator Co.
Novo Englos Co.
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Union Iron Works, Inc.
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Member: Associated Equipment Distributors

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118 Western Ave. Boston, Mass.

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ATLAS—Powder, Blasting Equipment
BACCO—Bulldozers
BEEBE BROS.—Hoists
BLYSTONE—Mortar Mixers
BUCYRUS-ERIE—Cranes, Shovels, Draglines
BURCH—Road Paving Machinery
CLEVELAND—Formgraders
C. R. JAHN CO.—Trailers
GARDNER-DENVER—Air Compressors
HALES—Elevators, Conveyors and Loaders
HAUCK—Oil Burners and Heaters
HAZARD—Wire Ropes, Cable
HELTZEL—Bins and Forms
HOMESTEAD—Hydraulic Jenny Cleaner
MARLOW—Self-Priming Pumps
MASTER—Vibrators
PIONEER—Crushers, Gravel Plants
RANSOME—Concrete Mixers, Chuting Equip.
GAR WOOD—Scrapers, Sheepfoot Rollers

Member: Associated Equipment Distributors

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Boston, Springfield, Worcester, Mass.; Portland, Bangor, Me.; Hartford, New Haven, Conn.; Concord, N. H.; Bellevue Falls, Vt.; Providence, R. I.

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Burch Corp.
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McKernan-Terry Corp., and Lambert-Nat'l Hoist Div.
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Owen Bucket Co.
Page Engineering Co.
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Teledo Pressed Steel Co.
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Member: Associated Equipment Distributors

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Beebe—Saw Tables
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Inley—Shovels, Cranes, Wagons, Buckets & Trailers
Jackson—Wheelbarrows & Concrete Carts
Johnson—Bins, Batches & Wheelbarrow Scales, etc.
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Longitudinal Finishers, Mudlocks
Kwik-Mix—Concrete Mixers, Mortar & Plaster & Bituminous Mixers
Master—Vibrators, Generators, etc.
Page—Dragline Buckets
P. & M.—Trenchers, Backfillers
Sagen—Derrick, Winches, etc.
Sullivan—Compressors, Rollers, Paving Breakers, etc.
Timken—Rock Bits
Union—Pile Hammers, etc.
Also small tools, etc.

Member: Associated Equipment Distributors

W. H. ANDERSON CO., INC.

47 W. Seven Mile Rd., Detroit, Mich.

Phone: Townsend 9-5400

(Exclusive)
American Cable Wire Rope
Buffalo-Springfield Rollers
Cleveland Trencher Ditchers, Cranes
Euclid Bottom Dump & Rear Dump Dirt Handling Trucks
Grand Specialties C Clamps
Hais Loaders
Iowa—Asphalt, Gravel, Rock Plants, Crushers, Conveyors, Bins, etc.
C. S. Johnson Batches, Rins, etc.
Knechtel-Conc. Mixers
Linn Track Trucks
Metal Form Steel Rd.
Forms, Curb, Slio, Wall Forms, etc.
Municipal St. Sweepers, Fishers, etc.
New Engines, Pumps, Hoists, etc.
Thew—Cranes, Shovels, etc.
Wellman Engrg. Buckets
Whitman Precision Floor Finisher (Gas or Elec.)
Werthington Pump Compressors, Pneumatic Tools (Non-exclusive)
Page Engrs. Dragline Buckets
Sagen Derrick Pole Derricks
Sterling Wheelbarrows, Concrete Carts

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ADAMS Power Grader
BAILY Concrete Vibrator
BARCO Hammers
BEACH Saws
Buckeye Concrete Surface
BUCYRUS-ERIE Scrapers and Bulldozers
BUFFALO-SPRINGFIELD Compressors and Tools
CLEVER-BROOKS Rollers
CORRUGATED Steel Sheet Piling
GORMAN-RUPP Pumps
INSLEY Shovels & Cranes
INTERNATIONAL Indus. Tractors
IOWA "Cedar Rapids" Crusher Plants and Equip.
JOHNSON Batches and Dumpsters
KWIK-MIX Mixers
KOEHRING Pavers, Mixers, Cranes, Dumpsters
BUCYRUS-ERIE Scrapers and Bulldozers
LIDGERWOOD Hoists
METAL FORMS CORP.
BARRY Diesels
OWEN Buckets
RAMSEY Hoists, Winches
ROSCO Trailers and Bituminous Distributors
SARGENT Snow Plows
"SHOGO" Rotary Snow Plow
SUPERIOR Form Clamps
TRACKSON Loaders and Cranes
UNION IRON WORKS
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WM. H. ZIEGLER CO., INC.

Minneapolis, St. Paul, Duluth, Crookston, Minn.

ATHEY—Crawlers, Dump Wagons, Trailers
BARBER-GREENE—Conveyors, Loaders, Ditchers
BUCYRUS-ERIE—Power Shovels, Cranes, Draglines
BULEY—Bins
"CATERPILLAR"—Tractors, Engines, Road Machinery
DAVENPORT—BELER—Locomotives, Snow Plows
FOUR WHEEL DRIVE AUTO—Trucks
FRINK—Snow Plows
GARDNER-DENVER—Air Compressors, Drills
HOMESTEAD—Hydraulic Jenny Spray Cleaners
KILLER—Road Rippers, Scrapers
LAPLAND-CHOATE—Bulldozers, Snow Plows, Dump Wagons
LESCHEN—Wire Ropes
LETOURNEAU—Dir. Moving Equipment
LITTLEFORD—Oil Distributors, Tar Kettles, Heaters
MADSEN—Asphalt Plants
PIONEER—Crushers, Gravel Plants
REX—Mixers, Pavers, Mortar Mixers, Pumps
"WILLIAMS"—Buckets

Member: Associated Equipment Distributors

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2305 Pennway, Kansas City, Mo.

Representing

Austin-Western Rd. Machy. Co.
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Bulfinch Co.
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Cleveland Tractor Co.
Electric Tamping & Equipment Co.
Jaeger Machine Co.
Lakewood Engineering Co.
LeRoy Co.—Air Compressors
McKernan-Terry Corp.
Red Star Products Co.
Sagen Derrick Co.
The Shovel Co.
Union Fork & Hoe Co.
Whitcomb Locomotive Co.
"Williams"—Buckets and Trailers
Wm. Bros. Boiler & Mfg. Co.

Member: Associated Equipment Distributors

O. B. AVERY COMPANY

1325 Macklind Avenue St. Louis, Mo.

Exclusive Distributors of

AMERICAN Hoists & Derrick
AUSTIN-WESTERN Graders, Rollers, Sweepers, Scrapers, Crushers
BARCO Hammers
BLAW-KNOX Bins, Buckets, Flashers, Forms
BRODERICK & BASCOM Wire Rope
BURN BELT Mixers, Pavers, Pumps
CLEVELAND Air Tools
CLEVELAND Trenchers
DEMPSTER Buckets
LITTLEFORD Distributors, Tar Kettles
MASTER Vibrators, Generators
MCKERNAN-TERRY Pile Hammers
NORTHWEST Shovels, Cranes & Draglines
R-B Subgraders
SCHRAMM Compressors
VULCAN Locomotives

Member: Associated Equipment Distributors

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3942-46 W. Pine Blvd., St. Louis, Mo.

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BUNL CO.—Portable Air Compressors
CHAMPION RIVET CO.—Rivets and Welding Rod
DETROIT HOIST & MACH. CO.—Air and Electric Hoists
DEVILBISS CO.—Paint Spray Equipment
HARDSCO—WONDER DRILL CO.—Rock Drills and Paving Breakers
W. H. KELLER, INC.—Super Pneumatic Tools
MUNSELL—Air-Operated Concrete Vibrators
PANGBURN CORP.—Handblast Equipment
PENNSYLVANIA—Air Compressors and Pumps
DAVID ROUND & SON—Chain Hoists
STANLEY—Air and Pipeline Filters
N. A. STRAND & CO.—Flexible Shaft Equipment
VAN DORN—Electric Drills, Grinders and Buffers
VICTOR—Welding and Cutting Apparatus
WESTINGHOUSE—Arc Welding Equipment
GUSTAV WIEDEKE CO.—Tube Expanders

JOSEPH KESL RENTAL EQUIPMENT CO.

430 Withers Ave., St. Louis, Mo.

(We rent construction equipment of all kinds)

Air Compressors Motor Graders
Blade Graders Pumps
Bulldozers, Backfillers Rock Crushers
Concrete Mixers Rollers
Crawler Wagons, Tractors Rotary Scrapers
Elevating Graders Sand, Gravel Etc.
Hoists Shovels and Draglines
Hydraulic Scrapers Wheel Tractors

Member: Associated Equipment Distributors

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St. Louis, Mo.*Representing*

Bally Vibrator Co. Huber Mfg. Co.
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Cleveland-Brooks Co. Koshing Co.
Concrete Surfacing Mach. Co. K-Mix Concrete Mixer Co.
C. D. Davis Co. Lidgerwood Mfg. Co.
Fairbanks, Morse & Co. Northern Conveyor Co.
Good Roads Machinery Corp. Parsons Co.
Hetzl Steel Form & Iron Co. Rosco Mfg. Co.
Frank G. Hough Co. Sterling Machinery Corp.
Sterling Wheelbarrow Co.

Member: Associated Equipment Distributors

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Complete Plants Rented

Archer—Tower Equipment
Bemis Bros. Bag Co.—Tar-
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Clyde—Hoists and Derricks
Davy—Compressors
Fairbanks—Morse—Scales
Hauk—Heaters
Kelley—Power Flints
LeRoi—Engines
Leschen—Rope
Link-Belt Speed—Matic
Shovels, Cranes, Draglines
Mail—Vibrators, Grinders,
Saws, Drills
Hoy—Pumps
Dew—Clamshell Buckets
Ramsey—Winches

Member: Associated Equipment Distributors

DALE & RANKIN, INC.

113 Frelinghuysen Ave., Newark, N. J.

Representing

AEROIL Heaters and Tools
ALEMITE Guns and Fittings
CHAMPION Power Cleaning Machines
HELTZEL Road Forms and Bins
INGERSOLL-RAND Compressors and Tools
JACKSON Wheelbarrows
REX Pumps
RICHMOND SCREW ANCHOR Concrete Accessories
VIBER Elec. & Pneu. Concrete Vibrators
WALKER-TURNER Radial Saws
WALSH Snow Plows
WINSLOW Scales

Member: Associated Equipment Distributors

JOHNSON & DEALAMAN, INC.

255 South Street Newark, N. J.

Representing

Allis-Chalmers Tractors, Graders, Power Units
American Snow Plows, Hoists, Derricks, Shovels
American Cable Trolley & Crescent Wire Rope
Bally Vibrators
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Connor, Caterpillar V.P., Dies Suddenly at Peoria

Thomas John Connor, Vice President in charge of production and a member of the Board of Directors of Caterpillar Tractor Co., died suddenly of a heart attack at his home in Peoria, Ill., on January 23, 1942.

Tom Connor always had a genuine regard for men who enjoy working with metal and he was one of them, loved and respected by all. He had an effective method of management, but held few conferences. He preferred moving around the huge plant, talking to the production foremen on the job, thus obtaining information on a problem from actual contact rather than visualizing it.

Mr. Connor left high school after one year to become an apprentice at the Geiger Iron Works at Stockton and after four years became a full-fledged machinist. Following another four-year period with that company he became a machinist with the C. L. Best Gas Tractor Co.,

then a production line foreman and tool foreman. When Holt and Best merged in 1925 to form Caterpillar, Mr. Connor was placed in charge of the design and production of tools. He became general factory manager of Caterpillar in 1930 at Peoria and was advanced to the position of vice president in charge of manufacturing and appointed director of the company in 1934.

Power Grader Bulletin

A new illustrated bulletin, No. 1946, describing its 99-M power grader, has recently been issued by the Austin-Western Road Machinery Co., Aurora, Ill. In the 99-M, according to the manufacturer, you get the all-wheel drive; power-operated steer on all wheels; power blade shift; more than enough blade pressure; and large, uniform, and fully interchangeable tires all around.

These and other features of design and construction are described in detail in the bulletin, and brief specifications

are given as well as information on available attachments for use with the 99-M.

Increase in Asphalt Use

The monthly statements of the U. S. Bureau of Mines for eleven months of 1941 show a net refinery production of asphalt in the United States amounting to 7,649,000 tons. This figure is 21 per cent above the previous record high which was attained in 1940. This eleven-month total exceeds the entire record year of 1940 by more than 1,000,000 tons.

This unprecedented asphalt production at refineries, according to The Asphalt Institute, was needed to meet the heavy demand for asphalt in laying the equivalent of thousands of miles of highways in the asphalt runway surfacing of the vast network of new defense airport construction and heavy-duty access roads to industrial plants and to Army and Navy establishments.

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Galion Iron Works & Mfg. Co.
Bucyrus-Erie—Scrapers, Bulldozers
Ingersoll-Rand Corp.
International—Tractors
Iowa Mfg. Co.—Cedar Rapids Line
Jager Machine Company
Jones Superior Mach. Co.
Littleford Bros.
The Owen Bucket Company
Page Engineering Co.
Sterling Wheelbarrow Co.
Thew Shovel Company
Trackson Company

Member: Associated Equipment Distributors

R. B. EVERETT & CO.

3112-18 Harrisburg Blvd. Houston, Texas

Representing

BLAW-KNOX Road Plant
Equipment, Bins, Clamshell Buckets
AMERICAN Hoisting Machinery
"P. & H." Gasoline Cranes
McKiernan-TERRY Pile Drivers, etc.
CONNERY Asphalt Equip.
CHAIN BELT Concrete Mixers, Saw Rigs, Pavers
NOVO Engines, Hoists, Pumps
"RED STAR" Wheelbarrows
BAUERMAN Cableways
BATES Wire Ties
PULSOMETER & N.Y.E. Steam Pumps
PATENT Safety Swinging Scaffolding
TRU-LAY Wire Rope
BUFFALO-SPRINGFIELD Road Builders
SULLIVAN Compressors
PORTABLE Conveyors
ETNYRE Asphalt Distrib.
FLYNN Subgrader
PAGE Dragline Buckets
MALL Vibrators

Member: Associated Equipment Distributors

PHILLIPS MACHINERY CO.

900 East Cary St. Richmond, Va.

Representing

Aeroil Burner Co., Inc.
Austin Machinery Corp.
Broderick & Bascom Rope Co.
Butler Bin Co.
Chain Belt Co.
Cleveland Trencher Co.
Clyde Iron Wks., Inc.
Concrete Surf. Machy. Co.
Independent Pneu. Tool Co.
Jackson Mfg. Co.
Jones Superior Mach. Co.
Manitowoc Engineering Wks.
Master Vibrator Co.
Owen Bucket Co.
Page Engineering Co.
Rogers Brothers Corp.
Saugen Derrick Co.
Sauerman Brothers, Inc.
Skilaw, Inc.
Volcan Iron Works
Walker-Turner Co.

Member: Associated Equipment Distributors

STAR MACHINERY COMPANY

1741 First Ave., South Seattle, Wash.

Representing

Advance Machine Co.
Air Reduction Sales Co.
American Hoist & Derrick Co.
American-Marsh Pumps, Inc.
Beebe Brothers, Inc.
Chain Belt Co.
C. H. & E. Mfg. Co.
DeVilbiss Co.
Dewalt Products Corp.
Garlinghouse Bros., Inc.
Gordon Smith, Inc.
Werthington Pump & Machy. Corp.
Hercules Motors Corp.
Independent Pneu. Tool Co.
Master Vibrator Co.
Oster Mfg. Co.
Red Star Mfg. Co.
Reed-Prentice Corp.
John A. Roebbling's Sons Co.
Whiteman Mfg. Co.
Wellman Engrg. Co.
Wisconsin Motor Corp.
Witte Engine Corp.
Werthington Pump & Machy. Corp.

Member: Associated Equipment Distributors

CONSTRUCTION EQUIPMENT CO.

1118-1124 Ide Ave., Spokane, Wash.

Representing

Aeroil Burner Co., Inc.
Archer Iron Works
Baker Wire Ties
Beebe Bros.
Blaw-Knox Co.
Broderick & Bascom Rope Co.
Bucyrus-Erie Co.
Buffalo-Springfield Roller Co.
Butler Bin Co.
Chain Belt Co.
Climax Eng. Co.
Concrete Surf. Machy. Co.
D-A Lubricant Co.
Detroit Graphite Co.
H. E. Dietz Co.
Duff-Norton Mfg. Co.
Fairbanks, Morse & Co.
Fate-Roth-Heath Co.
Homestead Valve Mfg. Co.
Kalamazoo Ry. Supply Co.
Le Roi Co.
The Linde Air Products Co.
M. & N. Wire Clamp Co.
Mail Tool Co.
Niagara H. Co.
Red Star Products Co.
Saugen Derrick Co.
Sheldon Mfg. Co.
Sterling Machinery Corp.
Sterling Wheelbarrow Co.
Sullivan Machinery Co.
Sunbeam Mfg. Co.
Templeton, Kenly & Co.
Williams Hyster Co.
Young Iron Works

Member: Associated Equipment Distributors

BOEHCK EQUIPMENT CO.

2404 W. Clybourn St. Milwaukee, Wis.

Representing

American Hoist & Derrick Co.
Bucyrus Machine Co.
Caine Steel Co.
Centaur Co.
Concrete Surfacing Machy.
Electric Tamping & Equip. Co.
Hauk Mfg. Company
Hercules St. Products Co.
Iowa Manufacturing Co.
Independent Pneumatic Tool Co.
Jaeger Machine Co.
C. S. Johnson Company
Jones-Superior Machine Co.
Le Roi Co.
A. Leoben & Sons Rope Co.
Lima Locomotive Works
McKiernan-Terry Corp.
N. P. Nelson Iron Wks., Inc.
Portable Machinery Company
Red Star Products, Inc.
Rogers Bros. Corp.
Saugen Derrick Co.
Superior Concrete Accessories, Inc.
Union Fork & Hoe Co.
Walker-Turner Co., Inc.
Wellman Engineering Co.

Member: Associated Equipment Distributors

CUNNINGHAM-ORTMAYER CO.

429 W. Michigan St. Milwaukee, Wis.

Representing

Blaw-Knox Truck Mixers
Butler Bin, Batches
C.H. & E. Pumps, Hoists, Saw Rigs
Case Tractors and Mowers
Cleveland Formgrader Paving Equipment
"Dewlake" Calcium Chloride
Eagle Crushers
Flexible Road Joint Machinery
Galion Iron Graders, Rollers and Spreaders
Good Roads Snow Plows
Handman 100-Hour Lantern, Torch
Holtz Steel Road Forms
Ingersoll-Rand Air Compressor, Tools
Insley Power Shovels, Conc. Towers & Buckets
Keohring Conc. Mixers, Cranes, Shovels, etc.
Kwik-Mix Conc. Mixers
Littleford Distributors,
Tar Kettles, Heaters
Multiplex Conc. Block Eq.
Omaha Dragline Buckets
Owen Clamshell Buckets, Grapples
Peasche Spray Painting Equip.
Parsons Trenchers
Reith Conc. Vibrators
Sterling Wheelbarrows
Tutill Hwy. Guard Rail
Wenzel Tarpsaulins
Wire Rope Corp. of America
Woodridge Scrapers

Member: Associated Equipment Distributors

DROTT TRACTOR CO., INC.

Milwaukee Wisconsin

Representing

Allis-Chalmers Tractors, Graders, Speed Trailers, Hauling and Power Units
Blaw-Knox Bulldozers, Graders, Snow Plows, etc.
Century Graders
Drott Equipment (Hi-Way Service Corp.) Angledrillers, Bulldozers, Tractor and Snow Plow Equipment, etc.
General Motors Diesel Packaged Power Units
Gunnison Flimmers
Halse Gravel and Snow Loading Equipment, Conveyors, etc.
Hauk Portable Melting Kettles
Hercules Rollers
Highway Trailer Earth Burying Machines
Hoogh Sweepers, Shovels
Hughes-Kennan Tractor Cranes
Jacobson Mowers
La Crosse Trailers
Oakleaf Trucks
Pacific Car & Vdy Hoists, Yards
Pioneer Conveyors, Gravel & Rock Crushing Eq., etc.
Quincy Compressors
Rogers Mowers
Russell H. Equip. Scrapers, Rollers, etc.
Seaman Pulvi-Mixers
"Silent Hoist" Cranes
Thew Shovels, Cranes, Motor Cranes
Tulsa Tractor Winches
Waukegan Snow Plows

Member: Associated Equipment Distributors

HUNTER TRACTOR & MACHY. CO.

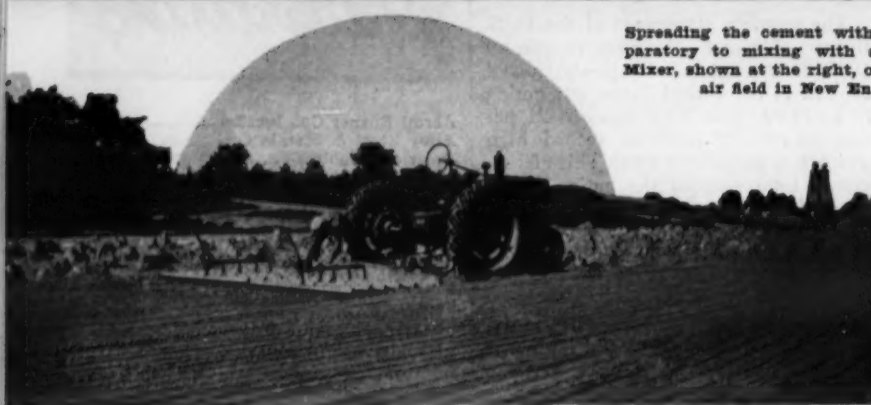
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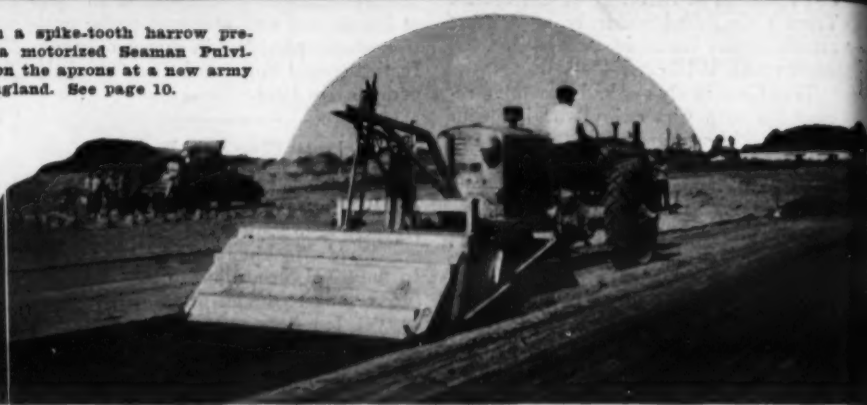
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Chain Belt Company
Clyde Iron Works, Inc.
Dempster Bros., Inc.
Kolley Electric Mach. Co.
Master Vibrator Co.
Northwest Engrg. Co.
R-B Equipment Co.
Saugen Derrick Co. (open account)
Sauerman Bros., Inc.
Silent Hoist Winch & Cr. Co.
Sullivan Machy. Co.
Syntron Co.
Universal Form Clamp Co.
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Contractors *and* Engineers Monthly



Spreading the cement with a spike-tooth harrow preparatory to mixing with a motorized Seaman Pulvi-Mixer, shown at the right, on the aprons at a new army air field in New England. See page 10.



C. & E. M. Photos

bove, chairs with long handles were used to support the longitudinal center rods prior to pouring concrete on the Central States Construction Co. dual-highway paving job on U. S. 53 near Duluth, Minn. At right, Inspector Walter checks the pavement with a 10-foot wood straight-edge. See page 2.



C. & E. M. Photo

The 60-foot concrete arch bridge built by Deniston & Garber on Indiana-U. S. 40 last summer. See page 13.



Below, the Whitmas & Borg plant for producing gravel base for the Central States Construction Co. job. A Lorain 75-A dragline supplied material to the Austin Western crushing plant powered by a Caterpillar D13,000 engine. See Page 2.



A Gar Wood scraper pulled by an A-C tractor loading heavy material for the dike at the south end of Lake Traverse, Minn. See page 9.

C. & E. M. Photo

